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DICTIONARY FILE UPDATES:  19 MAY 2006  HIGHEST RN 885029-44-7

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**********************************************************************
*                                                                    *
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* the IDE default display format and the ED field has been added,    *
* effective March 20, 2005.  A new display format, IDERL, is now     *
* available and contains the CA role and document type information. *
*                                                                    *
**********************************************************************

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for details.

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=> file hcaplu
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FILE COVERS 1907 - 22 May 2006  VOL 144 ISS 22
FILE LAST UPDATED: 19 May 2006  (20060519/ED)

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This file contains CAS Registry Numbers for easy and accurate substance identification.

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=> d que
L2           20 SEA FILE=REGISTRY ABB=ON  (110-86-1/BI OR 119-65-3/BI OR
                120-72-9/BI OR 120-73-0/BI OR 131714-35-7/BI OR 1333-74-0/BI
                OR 25232-42-2/BI OR 25233-30-1/BI OR 25823-41-0/BI OR 288-13-1/
                BI OR 288-32-4/BI OR 32109-42-5/BI OR 50641-39-9/BI OR
                7664-38-2/BI OR 7664-93-9/BI OR 7732-18-5/BI OR 7782-44-7/BI
                OR 9002-98-6/BI OR 9003-47-8/BI OR 91-22-5/BI)
L4            8 SEA FILE=REGISTRY ABB=ON  L2 AND PMS/CI
L5            2 SEA FILE=REGISTRY ABB=ON  L4 AND BENZIMID?
L6            6 SEA FILE=REGISTRY ABB=ON  L4 NOT L5
L9          270 SEA FILE=REGISTRY ABB=ON  1409.114.5/RID
L10         103 SEA FILE=REGISTRY ABB=ON  L9 AND PMS/CI
L11          12 SEA FILE=REGISTRY ABB=ON  L2 NOT L4
L12           7 SEA FILE=REGISTRY ABB=ON  L11 AND 1-2/NR
L20          79 SEA FILE=HCAPLUS ABB=ON  L5
L21       22338 SEA FILE=HCAPLUS ABB=ON  L6
L22           4 SEA FILE=HCAPLUS ABB=ON  L20 AND L21
L23      110325 SEA FILE=REGISTRY ABB=ON  333.401.37/RID
L24        1405 SEA FILE=REGISTRY ABB=ON  L23 AND PMS/CI
L25        1391 SEA FILE=HCAPLUS ABB=ON  L24
L26          19 SEA FILE=HCAPLUS ABB=ON  L21 AND L25
L27          20 SEA FILE=HCAPLUS ABB=ON  L22 OR L26
L30         125 SEA FILE=HCAPLUS ABB=ON  L10
L31           0 SEA FILE=HCAPLUS ABB=ON  L21 AND L30
L32       16178 SEA FILE=HCAPLUS ABB=ON  L12/D
L33           4 SEA FILE=HCAPLUS ABB=ON  L30 AND L32
L34          18 SEA FILE=HCAPLUS ABB=ON  L25 AND L32
L36          36 SEA FILE=HCAPLUS ABB=ON  L27 OR L31 OR L33 OR L34
L37          11 SEA FILE=HCAPLUS ABB=ON  L36 AND ELECTROCHEM?/SC,SX
L40         385 SEA FILE=HCAPLUS ABB=ON  ?BENZIMIDAZ? AND L32
L41         111 SEA FILE=HCAPLUS ABB=ON  ?BENZIMIDAZ? AND L21
L42         486 SEA FILE=HCAPLUS ABB=ON  L40 OR L41
L43          34 SEA FILE=HCAPLUS ABB=ON  L42 AND ELECTROCHEMICAL?/SC
L44          24 SEA FILE=HCAPLUS ABB=ON  L43 AND ELECTROLYT?
L45          14 SEA FILE=HCAPLUS ABB=ON  L43 AND PROTON?
L46          25 SEA FILE=HCAPLUS ABB=ON  L44 OR L45
L47           7 SEA FILE=HCAPLUS ABB=ON  L46 AND SOLID?
L48          15 SEA FILE=HCAPLUS ABB=ON  L37 OR L47

=> d 148 bib abs ind hitstr 1-15

L48  ANSWER 1 OF 15  HCAPLUS  COPYRIGHT 2006 ACS on STN
AN   2006:97642  HCAPLUS
DN   144:174272
TI   Fuel cell systems/stacks, their MEA with high durability under
     non-humidification condition, and manufacture thereof
IN   Nakafuji, Kunihiro; Muneuchi, Atsuo
PA   Sanyo Electric Co., Ltd., Japan; Samsung Electronics Co., Ltd.; Samsung
     SDI Co, Ltd.
SO   Jpn. Kokai Tokkyo Koho, 10 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
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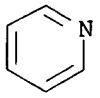
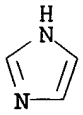
PI JP 2006032276 A2 20060202 JP 2004-213077 20040721
CN 1765992 A 20060503 CN 2005-10084797 20050721
PRAI JP 2004-213077 A 20040721
AB Dissolving basic polymers and strong acids in solvents, volatilizing the solvents to form **solids**, grinding the **solids** into powders, mixing them with fluororesins and rolling into sheets, and drying to give **electrolyte** membranes of title MEA. The **electrolytic** layers consist of basic polymers (e.g., powders with volume-average diameter 10-100 μm) and strong acids.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell MEA nonhumidification condition durability; doped **polybenzimidazole electrolyte** durability fuel cell; PTFE bonded strong acid basic polymer PEFC
IT **Polybenzimidazoles**
Polybenzothiazoles
Polybenzoxazoles
Polyoxadiazoles
Polyquinolines
Polyquinoxalines
Polythiazoles
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(acid-doped, **electrolyte** layers; PEFC employing fluoropolymer-bonded and acid-doped polymer **electrolytes** and showing good durability under non-humidifying condition)
IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(binders; PEFC employing fluoropolymer-bonded and acid-doped polymer **electrolytes** and showing good durability under non-humidifying condition)
IT Fuel cells
(polymer **electrolyte**; PEFC employing fluoropolymer-bonded and acid-doped polymer **electrolytes** and showing good durability under non-humidifying condition)
IT **110-86-1D**, Pyridine, polymers 129-00-0D, Pyrene, tetraaza, polymers **288-32-4D**, Imidazole, polymers 288-42-6D, Oxazole, polymers 289-06-5D, Thiadiazole, polymers 289-95-2, Pyrimidine 1337-81-1D, Vinylpyridine, polymers 29383-23-1D, Vinylimidazole, polymers
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(acid-doped, **electrolyte** layers; PEFC employing fluoropolymer-bonded and acid-doped polymer **electrolytes** and showing good durability under non-humidifying condition)
IT 9002-84-0, Polytetrafluoroethylene
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(binders, **electrolyte** layers; PEFC employing fluoropolymer-bonded and acid-doped polymer **electrolytes** and showing good durability under non-humidifying condition)
IT **110-86-1D**, Pyridine, polymers **288-32-4D**, Imidazole, polymers
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(acid-doped, **electrolyte** layers; PEFC employing fluoropolymer-bonded and acid-doped polymer **electrolytes** and showing good durability under non-humidifying condition)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



L48 ANSWER 2 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:812448 HCAPLUS
DN 143:349813
TI Hybrid materials approach in the design of electrodes and **electrolytes** for energy storage and conversion
AU Cuentas-Gallegos, Karina; Lira-Cantu, Monica; Casan-Pastor, Nieves; Asensio, Juan A.; Gomez-Romero, Pedro
CS Materials Science Institute of Barcelona (CSIC), Bellaterra, 08193, Spain
SO Materials Research Society Symposium Proceedings (2005), Volume Date 2004, 847(Organic/Inorganic Hybrid Materials-2004), 431-438
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal; General Review
LA English
AB A review. The integration of electro-ionically active inorg. species in polymer matrixes allows for the design of either electrode or **electrolyte** materials depending on the conducting or insulating properties of the polymer used. Conducting polymers can be used as the basis for a variety of hybrid electrode systems, whereas other polymers such as **polybenzimidazoles** were used as **electrolyte** membranes by themselves or in combination with inorg. **solid** acids. The authors will discuss the general approach of hybrid design with this in mind and specifically the authors will describe the recent results on the use of polyoxometalate-containing hybrids in energy storage and conversion devices. In this respect the authors have worked in the laboratory on electrochem. supercapacitors and fuel cells but emphasis should be made on the broader potential fields of application of this type of materials.
CC 52-0 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST review hybrid inorg org polymer **electrolyte** electrode supercapacitor; fuel cell electrode polymer **electrolyte** phosphoric hetero polyacid review
IT Electric current-potential relationship
(c;yclic voltammetry of electrodes; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)
IT Heteropoly acids
RL: DEV (Device component use); USES (Uses)
(composites with conducting polymers; hybrid materials approach in

design of electrodes and **electrolytes** for energy storage and conversion)

IT Membranes, nonbiological
(elec. conductive; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT Conducting polymers
Electrodes
Fuel cells
Hybrid organic-inorganic materials
Polymer **electrolytes**
(hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT Cyclic voltammetry
(of assembled electrodes; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT Electric capacitance
(of assembled supercapacitor; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT Capacitors
(super-; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT **25233-30-1P**, Polyaniline
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(blend with phosphomolybdic acid; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT 1314-56-3, Phosphorus oxide (P2O5), uses
RL: DEV (Device component use); USES (Uses)
(composite with poly(3,4-**benzimidazole**), phosphoric acid-doped; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT **32109-42-5P**, Poly(2,5-**benzimidazole**)
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(composite with polyphosphoric acid, phosphoric acid-doped; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT 12026-57-2, Phosphomolybdic acid (H3PMo12O40)
RL: DEV (Device component use); USES (Uses)
(composites with polyaniline; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT 7440-06-4, Platinum, uses 7782-42-5, Graphite, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(electrode base; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

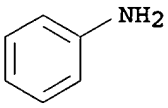
IT 66796-30-3, Nafion 117
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

IT 7664-38-2, Phosphoric acid, uses
RL: DEV (Device component use); USES (Uses)
(hybrid membranes doped with; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)

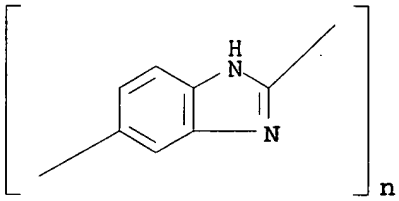
IT **25233-30-1P**, Polyaniline
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(blend with phosphomolybdic acid; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)
RN 25233-30-1 HCAPLUS
CN Benzenamine, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 62-53-3
CMF C6 H7 N



IT **32109-42-5P**, Poly(2,5-**benzimidazole**)
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(composite with polyphosphoric acid, phosphoric acid-doped; hybrid materials approach in design of electrodes and **electrolytes** for energy storage and conversion)
RN 32109-42-5 HCAPLUS
CN Poly(1H-benzimidazole-2,5-diyl) (9CI) (CA INDEX NAME)



RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 3 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:599554 HCAPLUS
DN 143:117990
TI Additives for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells
AU Kato, T.; Fujimoto, M.; Kado, T.; Sakaguchi, S.; Kosugi, D.; Shiratuchi, R.; Takashima, W.; Kaneto, K.; Hayase, S.
CS Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology, Kitakyushu, 808-0196, Japan
SO Journal of the Electrochemical Society (2005), 152(6), A1105-A1108
CODEN: JESOAN; ISSN: 0013-4651
PB Electrochemical Society
DT Journal
LA English
AB Dye-sensitized solar cells (DSCs) are **solidified** with gelators containing poly(vinylpyridine) and 1,2,4,5-tetra(bromomethyl)benzene. The photoconversion efficiencies are improved by new additives. LiI and

t-butylpyridine are commonly added in **electrolytes** for increasing short-circuit current (Jsc) and open-circuit voltage (Voc). These additives inhibit the gel **electrolyte** precursors from **solidifying.** New additives, combinations of HOAc, and Me pyrimidine or Me **benzimidazole**, do not inhibit the **solidification** and are effective for increasing both Jsc and Voc. These mechanisms are discussed in terms of electron diffusion coeffs., I-3 diffusion coeffs., and charge-transfer resistance between counter electrodes and gel **electrolytes.**

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76

ST dye sensitized solar cell gel **electrolyte** additive

IT Photoelectrochemical cells
(additives for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells)

IT **Electrolytes**
(**electrolyte** additives for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells)

IT 64-19-7, Acetic acid, uses 91-22-5, Quinoline, uses 109-06-8, 2-Methyl pyridine 30304-58-6, Methyl **benzimidazole** 55133-63-6, Methyl pyrimidine
RL: MOA (Modifier or additive use); USES (Uses)
(additive for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells)

IT 13463-67-7, Titanium oxide (TiO2), uses 15442-91-8D, poly(vinylpyridine) crosslinked with
RL: DEV (Device component use); USES (Uses)
(additives for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells with)

IT 7553-56-2, Iodine, uses **9003-47-8D**, Poly(vinylpyridine), crosslinked with bromomethyl benzene
RL: DEV (Device component use); USES (Uses)
(gel **electrolyte** precursor containing; additives for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells with)

IT 119171-18-5
RL: DEV (Device component use); USES (Uses)
(gel **electrolyte** precursor; additives for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells with)

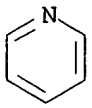
IT **9003-47-8D**, Poly(vinylpyridine), crosslinked with bromomethyl benzene
RL: DEV (Device component use); USES (Uses)
(gel **electrolyte** precursor containing; additives for increased photoenergy conversion efficiencies of quasi-**solid**, dye-sensitized solar cells with)

RN 9003-47-8 HCAPLUS

CN Pyridine, ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1337-81-1
CMF C7 H7 N
CCI IDS



D1— CH═ $CH_2$

RE.CNT 42 THERE ARE 42 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 4 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:260353 HCAPLUS
DN 142:339054
TI Phosphonic-acid grafted hybrid inorganic-organic proton electrolyte membranes for fuel cells
IN Li, Siwen; Lui, Meilin; Hase, Kohei; Nakanishi, Masatsugu; Li, Wen; Ukai, Junzo
PA Toyota Technical Center Usa, Inc., USA; Georgia Tech Research Corporation
SO PCT Int. Appl., 45 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | WO 2005027240 | A2 | 20050324 | WO 2004-US29741 | 20040913 |
| | WO 2005027240 | A3 | 20060309 | | |
| | W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | | |
| | RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| | US 2005113547 | A1 | 20050526 | US 2004-938268 | 20040910 |
| PRAI | US 2003-502178P | P | 20030911 | | |
| | US 2003-511836P | P | 20031016 | | |
| | US 2004-938268 | A | 20040910 | | |

AB A proton conducting polymer is formed by the copolymn. of a plurality of compds., including a silicon compound comprising an organic chain, and a compound including at least one acid group. The polymer comprises a hybrid organic inorg. matrix having acid groups linked through a linking group. The linking group may include one or more electron withdrawing groups. The electron withdrawing group may be a halogen.
IC ICM H01M
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST phosphonic acid grafted hybrid inorg org membrane fuel cell
IT Fuel cell electrolytes
Polymer networks

(phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT Polyamides, uses
Polybenzimidazoles
Polyurethanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT Polycarbosilanes
RL: TEM (Technical or engineered material use); USES (Uses)
(polyamine-; phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT Polyamines
RL: TEM (Technical or engineered material use); USES (Uses)
(polycarbosilane-; phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT Fuel cells
(polymer electrolyte; phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT Ionic conductivity
(proton; phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT 757-44-8, Diethoxyphosphoryl ethyltriethoxysilane
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT 848646-81-1P 848646-83-3P 848646-84-4P 848646-86-6P 848646-87-7P
848646-89-9P 848647-03-0P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT 88684-13-3P 848646-78-6P 848646-79-7P 848646-80-0P
RL: SPN (Synthetic preparation); PREP (Preparation)
(phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

IT **9002-98-6** 9003-05-8, Polyacrylamide 28212-50-2,
Poly(bis(trifluoroethoxy)phosphazene) **32109-42-5**,
Poly(2,5-benzimidazole)
RL: TEM (Technical or engineered material use); USES (Uses)
(phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

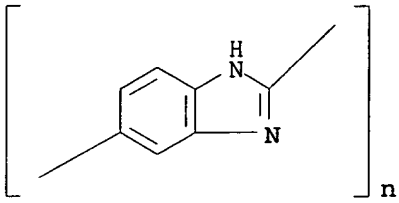
IT **9002-98-6 32109-42-5**, Poly(2,5-benzimidazole)
RL: TEM (Technical or engineered material use); USES (Uses)
(phosphonic-acid grafted hybrid inorg.-organic proton electrolyte membranes for fuel cells)

RN 9002-98-6 HCAPLUS
CN Aziridine, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 151-56-4
CMF C2 H5 N

RN 32109-42-5 HCAPLUS
CN Poly(1H-benzimidazole-2,5-diyl) (9CI) (CA INDEX NAME)



L48 ANSWER 5 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:14471 HCAPLUS
DN 142:97496
TI Preparation of polymer **electrolyte** membranes with high durability
IN Miyake, Naoto; Wakizoe, Masanobu; Honda, Eiji
PA Asahi Kasei Kabushiki Kaisha, Japan
SO PCT Int. Appl., 101 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | WO 2005000949 | A1 | 20050106 | WO 2004-JP9220 | 20040623 |
| | WO 2005000949 | C2 | 20050707 | | |
| | W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | | |
| | RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| | CA 2527871 | AA | 20050106 | CA 2004-2527871 | 20040623 |
| | US 2005053822 | A1 | 20050310 | US 2004-874246 | 20040624 |
| PRAI | JP 2003-184226 | A | 20030627 | | |
| | JP 2003-326230 | A | 20030918 | | |
| | WO 2004-JP9220 | W | 20040623 | | |

AB Title membranes comprise (A) fluoropolymer **electrolytes** having an ion-exchange group and (B) basic polymers, wherein a part of the component A and a part of the component B are chemical bonded with each other if desired. A membrane electrode assembly wherein the polymer **electrolyte** membrane is tightly held between an anode and a cathode and a **solid** polymer fuel cell using the membrane electrode assembly are further disclosed. Thus, 5% Nafion solution and di-Me acetamide were heated at 120° for 1 h and evaporated to give 1.5% polymer solution, 100.0 g of which was mixed with 16.3 g 1% poly[2,2'-(m-phenylene)-5,5'-**bibenzimidazole**] di-Me acetamide solution, 97.1 g 5% Nafion solution was added therein, cast onto a dish, dried at 60° for 1 h and 80° for 1 h, and heated at 160° for 1 h to give a polymer **electrolyte** membrane with haze 0.6%,

ion exchange capacity 0.77 meq, and good durability when fabricated into a fuel cell.

IC ICM C08J005-22
ICS C08L027-12; C08K005-3447; H01B001-06; H01M008-02; H01M008-10

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST polymer **electrolyte** membrane durability prepn; Nafion **polyphenylenebibenzimidazole** blend polymer **electrolyte** prepn

IT Fluoropolymers, uses
RL: DEV (Device component use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(blend with basic polymers; preparation of polymer **electrolyte** membranes with high durability)

IT Polyanilines
**Polybenzimidazoles**
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(blend with fluoropolymer **electrolyte**; preparation of polymer **electrolyte** membranes with high durability)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fluorine- and sulfo-containing, ionomers, blend with basic polymers; preparation of polymer **electrolyte** membranes with high durability)

IT Polymer blends
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fluoropolymer-basic polymer blends; preparation of polymer **electrolyte** membranes with high durability)

IT Fuel cells
Membranes, nonbiological
(polymer **electrolyte**; preparation of polymer **electrolyte** membranes with high durability)

IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, blend with basic polymers; preparation of polymer **electrolyte** membranes with high durability)

IT Ionomers
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, blend with basic polymers; preparation of polymer **electrolyte** membranes with high durability)

IT Polymer **electrolytes**
(preparation of polymer **electrolyte** membranes with high durability)

IT Ionic conductors
(**protonic**; preparation of polymer **electrolyte** membranes with high durability)

IT 26101-19-9

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(assumed monomers, blend with fluoropolymer **electrolyte**; preparation of polymer **electrolyte** membranes with high durability)

IT 69462-70-0DP, hydrolyzed
RL: DEV (Device component use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(blend with basic polymer; preparation of polymer **electrolyte** membranes with high durability)

IT **9002-98-6**, P 70 **9003-47-8**, Polyvinyl pyridine
**25734-65-0**
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(blend with fluoropolymer **electrolyte**; preparation of polymer **electrolyte** membranes with high durability)

IT **9002-98-6**, P 70 **9003-47-8**, Polyvinyl pyridine
**25734-65-0**
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(blend with fluoropolymer **electrolyte**; preparation of polymer **electrolyte** membranes with high durability)

RN 9002-98-6 HCAPLUS
CN Aziridine, homopolymer (9CI) (CA INDEX NAME)

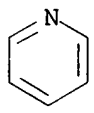
CM 1

CRN 151-56-4
CMF C2 H5 N

RN 9003-47-8 HCAPLUS
CN Pyridine, ethenyl-, homopolymer (9CI) (CA INDEX NAME)

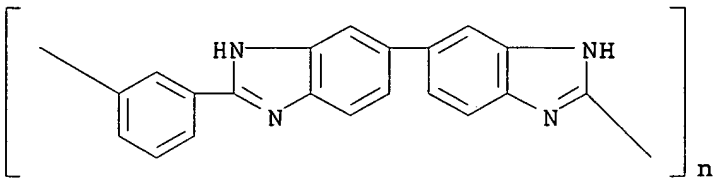
CM 1

CRN 1337-81-1
CMF C7 H7 N
CCI IDS



D1— CH═ $CH_2$

RN 25734-65-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,3-phenylene) (9CI) (CA INDEX NAME)




RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 6 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:117315 HCAPLUS
DN 140:149157
TI An electrode for an electrochemical cell like a secondary battery and an electric double layer capacitor
IN Nobuta, Tomoki; Nishiyama, Toshihiko; Kamisuki, Hiroyuki; Kaneko, Shinako; Kurosaki, Masato; Nakagawa, Yuji; Mitani, Masaya
PA NEC Tokin Corporation, Japan
SO Eur. Pat. Appl., 20 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | EP 1388906 | A2 | 20040211 | EP 2003-16458 | 20030722 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK | | | | |
| | JP 2004127920 | A2 | 20040422 | JP 2003-198660 | 20030717 |
| | JP 3701952 | B2 | 20051005 | | |
| | CN 1481042 | A | 20040310 | CN 2003-152651 | 20030804 |
| | US 2004029003 | A1 | 20040212 | US 2003-634607 | 20030805 |
| | HK 1060654 | A1 | 20051125 | HK 2004-102952 | 20040427 |
| PRAI | JP 2002-227160 | A | 20020805 | | |

AB This invention provides an electrode for an electrochem. cell in which an active material in an electrode material is a proton-conducting compound, wherein the electrode material comprises a nitrogen-containing heterocyclic compound or a polymer having a unit containing a nitrogen-containing heterocyclic moiety.
IC ICM H01M004-60
ICS H01M004-02
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 27, 38, **72**, 76
ST battery electrode nitrogen contg heterocyclic compd; elec double layer capacitor electrode nitrogen contg heterocyclic compd
IT Capacitors
(double layer; electrode for electrochem. cell like secondary battery and elec. double layer capacitor)
IT Battery cathodes
Battery electrodes
Capacitor electrodes
Secondary batteries

(electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

IT Carbon black, uses
Fluoropolymers, uses
RL: MOA (Modifier or additive use); USES (Uses)
(electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

IT Heterocyclic compounds
RL: DEV (Device component use); USES (Uses)
(nitrogen; electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

IT Heterocyclic compounds
RL: DEV (Device component use); USES (Uses)
(polymers, nitrogen-containing; electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

IT Polyquinoxalines
RL: DEV (Device component use); USES (Uses)
(polyphenylquinoxalines; electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

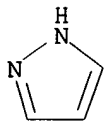
IT 51-17-2, Benzimidazole 51-17-2D, Benzimidazole, derivative 288-13-1, Pyrazole **288-13-1D**, Pyrazole, derivative 288-32-4, Imidazole, uses **288-32-4D**, Imidazole, derivative 288-88-0, 1H-1,2,4-Triazole 670-96-2, 2-Phenylimidazole 20154-03-4, 3-Trifluoromethylpyrazole **25232-42-2**, Polyvinylimidazole 37306-44-8, Triazole 37306-44-8D, Triazole, derivative 420784-28-7, 1H-Indole trimer 652968-46-2 652968-47-3 **652968-48-4**
RL: DEV (Device component use); USES (Uses)
(electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

IT 24937-79-9, Polyfluorovinylidene
RL: MOA (Modifier or additive use); USES (Uses)
(electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

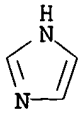
IT 7440-44-0, Carbon, uses
RL: MOA (Modifier or additive use); USES (Uses)
(vapor-grown; electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

IT **288-13-1D**, Pyrazole, derivative **288-32-4D**, Imidazole, derivative **25232-42-2**, Polyvinylimidazole **652968-48-4**
RL: DEV (Device component use); USES (Uses)
(electrode for electrochem. cell like secondary battery and elec. double layer capacitor)

RN 288-13-1 HCAPLUS
CN 1H-Pyrazole (9CI) (CA INDEX NAME)



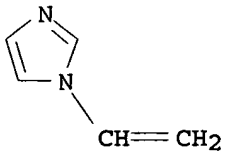
RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 25232-42-2 HCAPLUS
CN 1H-Imidazole, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

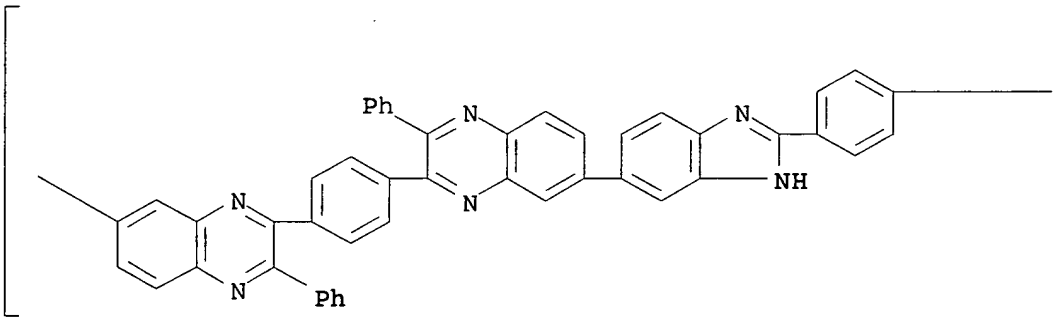
CM 1

CRN 1072-63-5
CMF C5 H6 N2

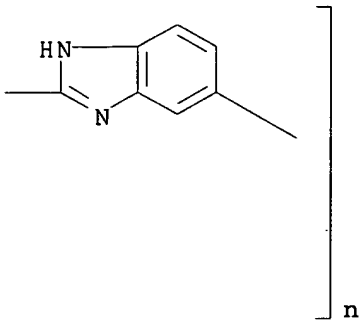


RN 652968-48-4 HCAPLUS
CN Poly[(3-phenyl-7,2-quinoxalinediyl)-1,4-phenylene(3-phenyl-2,7-quinoxalinediyl)-1H-benzimidazole-5,2-diyl-1,4-phenylene-1H-benzimidazole-2,5-diyl] (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 1-B




L48 ANSWER 7 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:117171 HCAPLUS
DN 140:165009
TI Proton-conductive polyazole membranes containing phosphonic acid group-containing polymers and their application in fuel cells
IN Calundann, Gordon; Uensal, Oemer; Kiefer, Joachim
PA Celanese Ventures GmbH, Germany
SO Ger. Offen., 32 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | DE 10235358 | A1 | 20040212 | DE 2002-10235358 | 20020802 |
| | CA 2494330 | AA | 20040219 | CA 2003-2494330 | 20030731 |
| | WO 2004015802 | A1 | 20040219 | WO 2003-EP8461 | 20030731 |
| | W: BR, CA, CN, JP, KR, MX, US | | | | |
| | RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR | | | | |
| | EP 1527493 | A1 | 20050504 | EP 2003-784120 | 20030731 |
| | EP 1527493 | B1 | 20060104 | | |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, SK | | | | |
| | CN 1675790 | A | 20050928 | CN 2003-818584 | 20030731 |
| | JP 2005534784 | T2 | 20051117 | JP 2004-526830 | 20030731 |
| | AT 315278 | E | 20060215 | AT 2003-784120 | 20030731 |
| | US 2005244694 | A1 | 20051103 | US 2005-522839 | 20050606 |
| PRAI | DE 2002-10235358 | A | 20020802 | | |
| | WO 2003-EP8461 | W | 20030731 | | |

AB The present invention concerns proton-conductive polymer membranes phosphonic acid group-containing polymers, available by a procedure, comprising the steps: (A) mixing one or more aromatic tetra amino compds. with one or more aromatic carboxylic acids and/or their esters, which contain at least two acid radicals , or mixing one or more aromatic and/or heteroarom. diaminocarboxylic acids, in . vinyl-containing phosphonic acids to form a solution and/or a dispersion, (B) heating the solution and/or dispersion from step (A) under inert gas to temps. of ≤350° to form a polyazole, (C) applying a layer using the mixture in accordance with step (A) and/or (B) on a carrier, and (D) polymerization of the vinyl-containing phosphonic acids existing in the layer from step (C).
IC ICM C08J005-22
ICS H01M008-02; B01D071-58

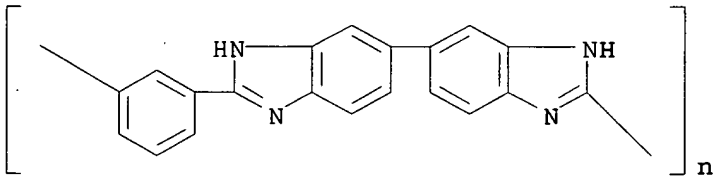
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): **52**
ST proton conductive polyazole membrane fuel cell; vinyl phosphonic acid polymer contg polyazole membrane
IT Polymerization
(cyclopolymn.; of aromatic tetraamino compds. with polycarboxylic acids in presence of vinyl-containing phosphonic acids in manufacture of proton-containing membranes)
IT Polymerization
(of vinyl compds. having phosphonic acids in presence of polyazoles in manufacture of proton conductive membranes for fuel cells)
IT Vinyl compounds, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymers, phosphonic acid-containing; proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)
IT Sulfonic acids, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymers; proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)
IT Fuel cell electrodes
Fuel cell separators
Ionic conductors
Polyelectrolytes
(proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)
IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyoxadiazoles
Polyquinoxalines
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)
IT Polymer blends
RL: TEM (Technical or engineered material use); USES (Uses)
(proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)
IT Polymers, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(sulfo-containing; proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)
IT 13598-36-2DP, Phosphonic acid, vinyl group-containing, polymers
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)
IT **110-86-1DP**, Pyridine, polymers 289-06-5DP, Thiadiazole, polymers 289-95-2DP, Pyrimidine, polymers **25734-65-0P 27233-57-4P 28576-59-2P 32075-68-6P 32109-42-5P**, Poly(1H-benzimidazole-2,5-diyl) 42209-07-4P 55861-56-8P 56713-21-4P 82370-43-2P, Polyimidazole **96926-85-1P 111404-83-2P** 111404-85-4P **132937-69-0P 240799-37-5P** **268567-69-7P** 368871-22-1P **471256-97-0P**

**471256-98-1P 471256-99-2P 471257-00-8P**
**471257-01-9P** 471257-02-0P 472960-34-2P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)

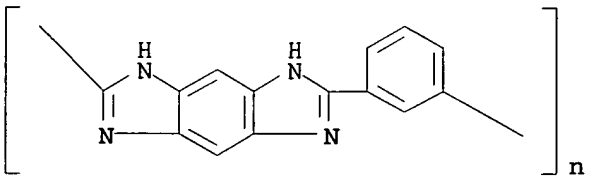
IT **110-86-1DP**, Pyridine, polymers **25734-65-0P**
**27233-57-4P 28576-59-2P 32075-68-6P**
**32109-42-5P**, Poly(1H-benzimidazole-2,5-diyl) **96926-85-1P**
**111404-83-2P 132937-69-0P 240799-37-5P**
**268567-69-7P 471256-97-0P 471256-98-1P**
**471256-99-2P 471257-00-8P 471257-01-9P**
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing phosphonic acid-containing vinyl polymers for fuel cells)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

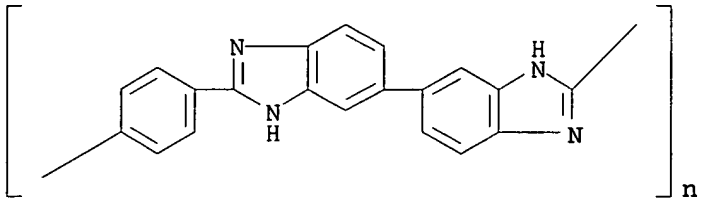
RN 25734-65-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,3-phenylene) (9CI) (CA INDEX NAME)



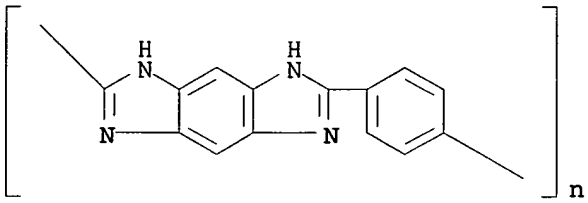
RN 27233-57-4 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1,3-phenylene] (9CI) (CA INDEX NAME)



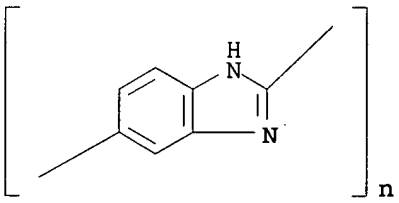
RN 28576-59-2 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,4-phenylene) (9CI) (CA INDEX NAME)



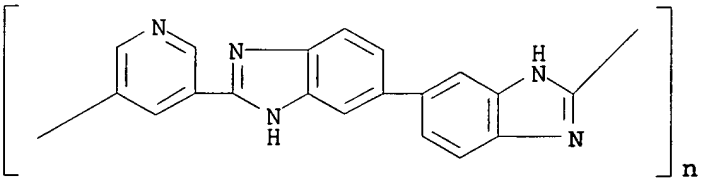
RN 32075-68-6 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1,4-phenylene] (9CI) (CA INDEX NAME)



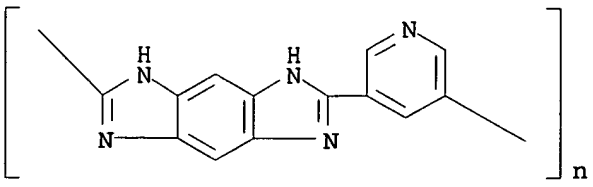
RN 32109-42-5 HCAPLUS
CN Poly(1H-benzimidazole-2,5-diyl) (9CI) (CA INDEX NAME)



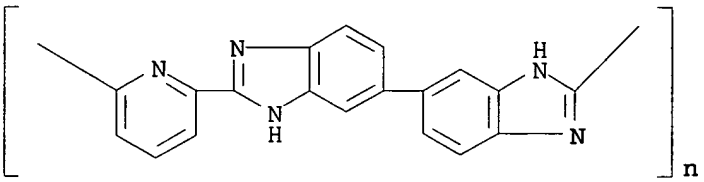
RN 96926-85-1 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-3,5-pyridinediyl) (9CI) (CA INDEX NAME)



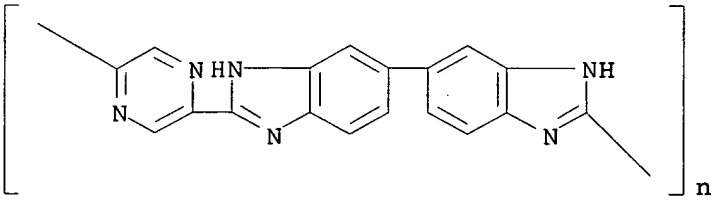
RN 111404-83-2 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-3,5-pyridinediyl] (9CI) (CA INDEX NAME)



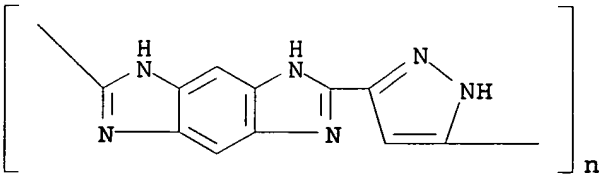
RN 132937-69-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-2,6-pyridinediyl) (9CI) (CA INDEX NAME)



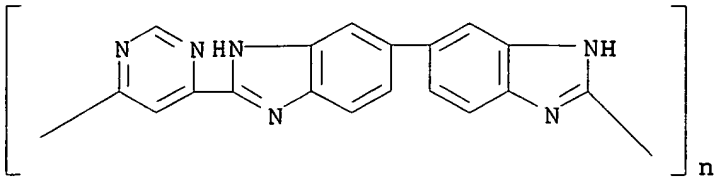
RN 240799-37-5 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-2,5-pyrazinediyl) (9CI) (CA INDEX NAME)



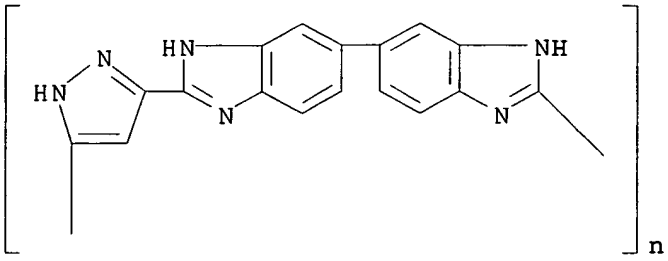
RN 268567-69-7 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1H-pyrazole-3,5-diyl] (9CI) (CA INDEX NAME)



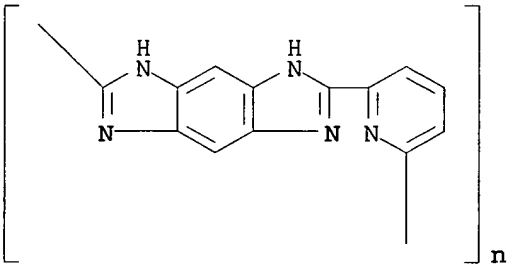
RN 471256-97-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-4,6-pyrimidinediyl) (9CI) (CA INDEX NAME)



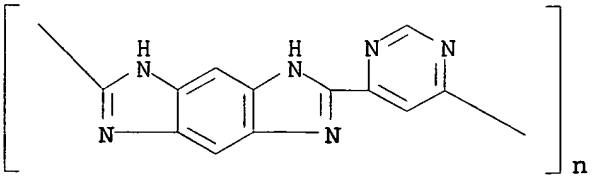
RN 471256-98-1 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1H-pyrazole-3,5-diyl) (9CI) (CA INDEX NAME)



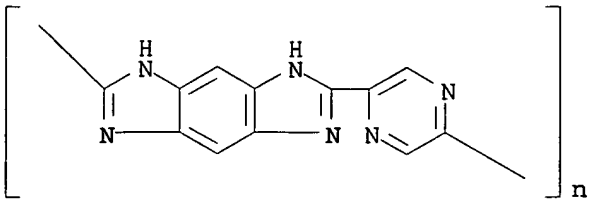
RN 471256-99-2 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-2,6-pyridinediyl] (9CI) (CA INDEX NAME)



RN 471257-00-8 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-4,6-pyrimidinediyl] (9CI) (CA INDEX NAME)



RN 471257-01-9 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-2,5-pyrazinediyl] (9CI) (CA INDEX NAME)



L48 ANSWER 8 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:117170 HCAPLUS
DN 140:165008
TI Proton-conductive polyazole membranes containing polymers having phosphonic acid and sulfonic acid groups and their application in fuel cells
IN Calundann, Gordon; Uensal, Oemer; Kiefer, Joachim
PA Celanese Ventures GmbH, Germany
SO Ger. Offen., 32 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 2

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | DE 10235357 | A1 | 20040212 | DE 2002-10235357 | 20020802 |
| | CA 2494530 | AA | 20040219 | CA 2003-2494530 | 20030731 |
| | WO 2004015803 | A1 | 20040219 | WO 2003-EP8462 | 20030731 |
| | W: BR, CA, CN, JP, KR, MX, US | | | | |
| | RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR | | | | |
| | EP 1527494 | A1 | 20050504 | EP 2003-784121 | 20030731 |
| | EP 1527494 | B1 | 20051228 | | |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, SK | | | | |
| | JP 2005534785 | T2 | 20051117 | JP 2004-526831 | 20030731 |
| | AT 314735 | E | 20060115 | AT 2003-784121 | 20030731 |
| | US 2005244695 | A1 | 20051103 | US 2005-523373 | 20050323 |
| PRAI | DE 2002-10235356 | A | 20020802 | | |
| | DE 2002-10235357 | A | 20020802 | | |
| | WO 2003-EP8462 | W | 20030731 | | |

AB The present invention concerns proton-conductive polymer membranes containing polymers having sulfonic acid and phosphonic acid groups, available by a procedure, comprising the steps: (A) mixing one or more aromatic tetra amino compds. with one or more aromatic carboxylic acids and/or their esters, which contain at least two acid radicals , or mixing one or more aromatic and/or heteroarom. diaminocarboxylic acids, in mixts. containing vinyl-containing sulfonic acids and vinyl-containing phosphonic acids to form a solution and/or a dispersion, (B) heating the solution and/or dispersion from step (A) under inert gas to temps. of ≤350° to form a polyazole, (C) applying a layer using the mixture in accordance with step (A) and/or (B) on a carrier, and (D) polymerization of the vinyl-containing sulfonic acids and vinyl-containing phosphonic acids existing in the layer from step (C).
IC ICM C08J005-22
ICS C08L079-00; H01M008-02; B01D071-58
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
ST proton conductive polyazole membrane fuel cell; vinyl sulfonic acid phosphonic acid polymer contg polyazole membrane

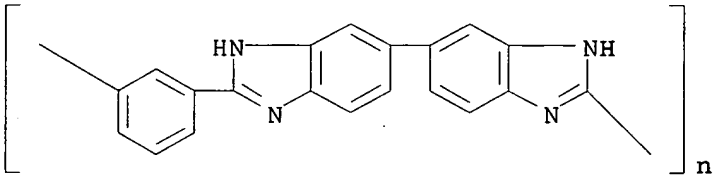
IT Polymerization
(cyclopolymn.; of aromatic tetraamino compds. with polycarboxylic acids in presence of vinyl-containing sulfonic acids and vinyl-containing phosphonic acids in manufacture of proton-containing membranes)
IT Polymerization
(of phosphonic acid-containing vinyl compds. and sulfonic acid-containing vinyl
compds. in presence of polyazoles in manufacture of proton conductive membranes for fuel cells)
IT Vinyl compounds, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymers, sulfonic acid- and phosphonic acid-containing; proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)
IT Sulfonic acids, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymers; proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)
IT Fuel cell electrodes
Fuel cell separators
Ionic conductors
Polyelectrolytes
(proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)
IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyoxadiazoles
Polyquinoxalines
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)
IT Polymer blends
RL: TEM (Technical or engineered material use); USES (Uses)
(proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)
IT Polymers, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(sulfo-containing; proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)
IT 13598-36-2DP, Phosphonic acid, vinyl group-containing, polymers
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)
IT **110-86-1DP**, Pyridine, polymers 289-06-5DP, Thiadiazole, polymers
289-95-2DP, Pyrimidine, polymers **25734-65-0P 27233-57-4P**
**28576-59-2P 32075-68-6P 32109-42-5P**,
Poly(1H-benzimidazole-2,5-diyl) 42209-07-4P 55861-56-8P 56713-21-4P
82370-43-2P, Polyimidazole **96926-85-1P 111404-83-2P**
111404-85-4P **132937-69-0P 240799-37-5P**
**268567-69-7P** 368871-22-1P **471256-97-0P**
**471256-98-1P 471256-99-2P 471257-00-8P**
**471257-01-9P** 471257-02-0P 472960-34-2P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM

(Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)

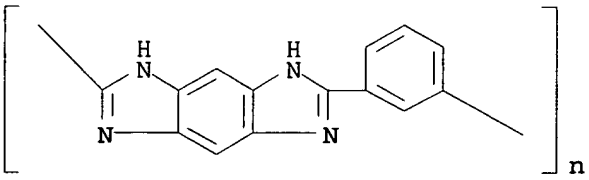
IT **110-86-1DP**, Pyridine, polymers **25734-65-0P**
**27233-57-4P 28576-59-2P 32075-68-6P**
**32109-42-5P**, Poly(1H-benzimidazole-2,5-diyl) **96926-85-1P**
**111404-83-2P 132937-69-0P 240799-37-5P**
**268567-69-7P 471256-97-0P 471256-98-1P**
**471256-99-2P 471257-00-8P 471257-01-9P**
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing vinyl polymers having phosphonic acid and sulfonic acid groups for fuel cells)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

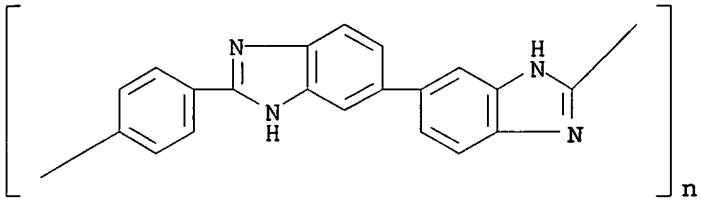
RN 25734-65-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,3-phenylene) (9CI) (CA INDEX NAME)



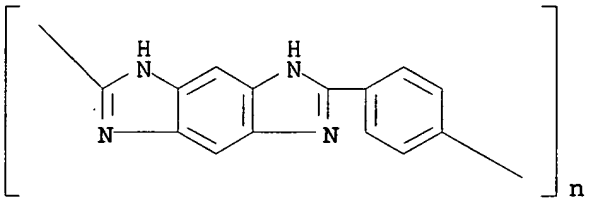
RN 27233-57-4 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1,3-phenylene] (9CI) (CA INDEX NAME)



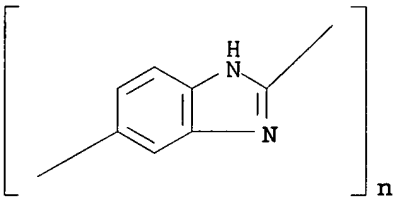
RN 28576-59-2 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,4-phenylene) (9CI) (CA INDEX NAME)



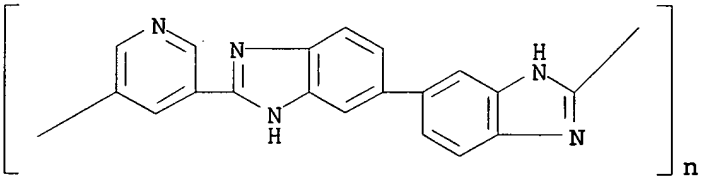
RN 32075-68-6 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1,4-phenylene] (9CI) (CA INDEX NAME)



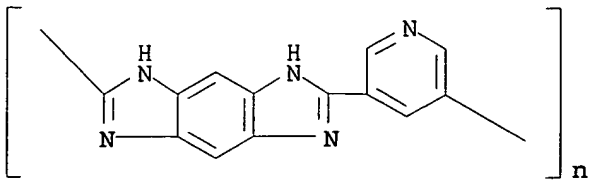
RN 32109-42-5 HCAPLUS
CN Poly(1H-benzimidazole-2,5-diyl) (9CI) (CA INDEX NAME)



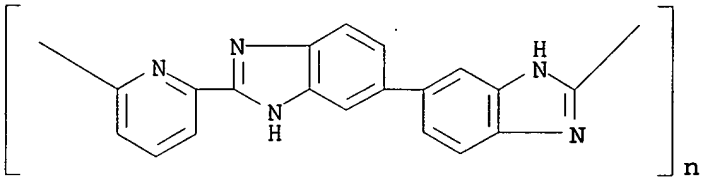
RN 96926-85-1 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-3,5-pyridinediyl) (9CI) (CA INDEX NAME)



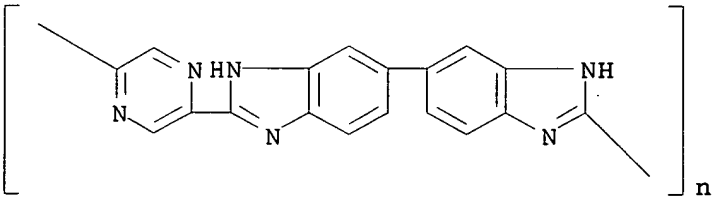
RN 111404-83-2 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-3,5-pyridinediyl] (9CI) (CA INDEX NAME)



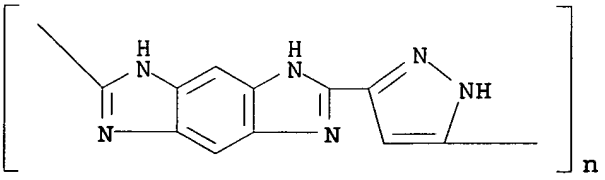
RN 132937-69-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-2,6-pyridinediyl) (9CI) (CA INDEX NAME)



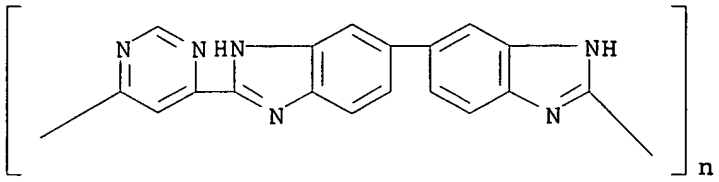
RN 240799-37-5 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-2,5-pyrazinediyl) (9CI) (CA INDEX NAME)



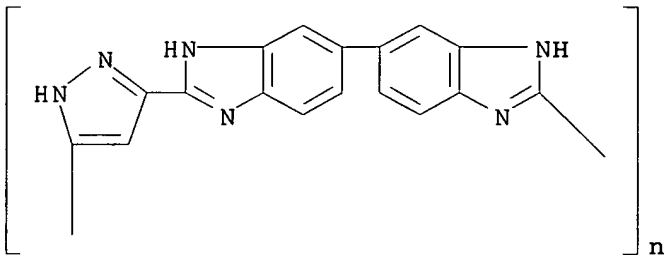
RN 268567-69-7 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1H-pyrazole-3,5-diyl] (9CI) (CA INDEX NAME)



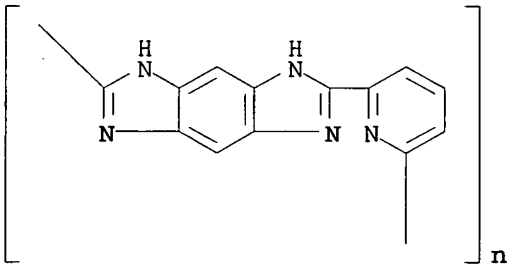
RN 471256-97-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-4,6-pyrimidinediyl) (9CI) (CA INDEX NAME)



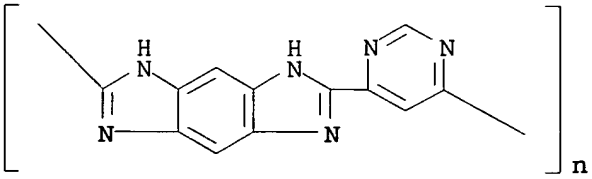
RN 471256-98-1 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1H-pyrazole-3,5-diyl) (9CI) (CA INDEX NAME)



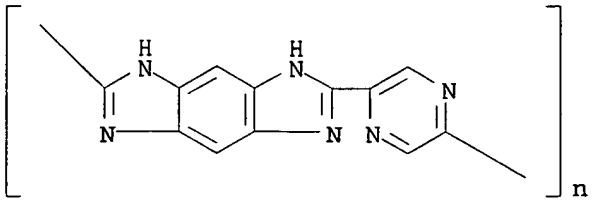
RN 471256-99-2 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-2,6-pyridinediyl] (9CI) (CA INDEX NAME)



RN 471257-00-8 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-4,6-pyrimidinediyl] (9CI) (CA INDEX NAME)



RN 471257-01-9 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-2,5-pyrazinediyl] (9CI) (CA INDEX NAME)



L48 ANSWER 9 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:117169 HCAPLUS
DN 140:165007
TI Proton-conductive polymer membrane based on sulfonic acid-containing polymers and their application in fuel cells
PA Celanese Ventures GmbH, Germany
SO Ger. Offen., 31 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 2

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | DE 10235356 | A1 | 20040212 | DE 2002-10235356 | 20020802 |
| | CA 2494530 | AA | 20040219 | CA 2003-2494530 | 20030731 |
| | WO 2004015803 | A1 | 20040219 | WO 2003-EP8462 | 20030731 |
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| | RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR | | | | |
| | EP 1527494 | A1 | 20050504 | EP 2003-784121 | 20030731 |
| | EP 1527494 | B1 | 20051228 | | |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, SK | | | | |
| | AT 314735 | E | 20060115 | AT 2003-784121 | 20030731 |
| | US 2005244695 | A1 | 20051103 | US 2005-523373 | 20050323 |
| PRAI | DE 2002-10235356 | A | 20020802 | | |
| | DE 2002-10235357 | A | 20020802 | | |
| | WO 2003-EP8462 | W | 20030731 | | |

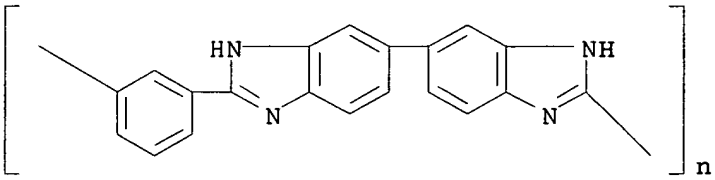
AB The present invention concerns proton-conductive polymer membranes containing sulfonic acid-containing polymers, available by a procedure, comprising the steps: (A) mixing one or more aromatic tetra amino compds. with one or more aromatic carboxylic acids and/or their esters, which contain at least two acid radicals , or mixing one or more aromatic and/or heteroarom. diaminocarboxylic acids, in a vinyl-containing sulfonic acid to form a solution and/or a dispersion, (B) heating the solution and/or dispersion from step (A) under inert gas to temps. of ≤350° to form a polyazole, (C) applying a layer using the mixture in accordance with step (A) and/or (B) on a carrier, and (D) polymerization of the vinyl-containing sulfonic acid existing in the layer from step (C).
IC ICM C08J005-22
ICS C08L079-06; H01M008-02; B01D071-58
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
ST proton conductive polyazole membrane fuel cell; vinyl sulfonic acid polymer contg polyazole membrane
IT Polymerization
(cyclopolymn.; of aromatic tetraamino compds. with polycarboxylic acids in presence of vinyl-containing sulfonic acids in manufacture of proton-conducting

membranes for fuel cells)
IT Polymerization
(of vinyl containing sulfonic acids in presence of polyazoles in manufacture of
proton conductive membranes for fuel cells)
IT Vinyl compounds, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymers, sulfo-containing; proton-conductive polyazole membranes containing
sulfonic acid-containing vinyl polymers for fuel cells)
IT Sulfonic acids, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymers; proton-conductive polyazole membranes containing sulfonic acid-containing vinyl polymers for fuel cells)
IT Fuel cell electrodes
Fuel cell separators
Ionic conductors
Polyelectrolytes
(proton-conductive polyazole membranes containing sulfonic acid-containing vinyl polymers for fuel cells)
IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyoxadiazoles
Polyquinoxalines
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing sulfonic acid-containing vinyl polymers for fuel cells)
IT Polymer blends
RL: TEM (Technical or engineered material use); USES (Uses)
(proton-conductive polyazole membranes containing sulfonic acid-containing vinyl polymers for fuel cells)
IT Polymers, uses
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(sulfo-containing; proton-conductive polyazole membranes containing sulfonic acid-containing vinyl polymers for fuel cells)
IT **110-86-1DP**, Pyridine, polymers 289-06-5DP, Thiadiazole, polymers
289-95-2DP, Pyrimidine, polymers **25734-65-0P 27233-57-4P**
**28576-59-2P 32075-68-6P 32109-42-5P**,
Poly(1H-benzimidazole-2,5-diyl) 42209-07-4P 55861-56-8P 56713-21-4P
82370-43-2P, Polyimidazole **96926-85-1P 111404-83-2P**
111404-85-4P **132937-69-0P 240799-37-5P**
**268567-69-7P** 368871-22-1P **471256-97-0P**
**471256-98-1P 471256-99-2P 471257-00-8P**
**471257-01-9P** 471257-02-0P 472960-34-2P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing sulfonic acid-containing vinyl polymers for fuel cells)
IT **110-86-1DP**, Pyridine, polymers **25734-65-0P**
**27233-57-4P 28576-59-2P 32075-68-6P**
**32109-42-5P**, Poly(1H-benzimidazole-2,5-diyl) **96926-85-1P**
**111404-83-2P 132937-69-0P 240799-37-5P**
**268567-69-7P 471256-97-0P 471256-98-1P**
**471256-99-2P 471257-00-8P 471257-01-9P**
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM

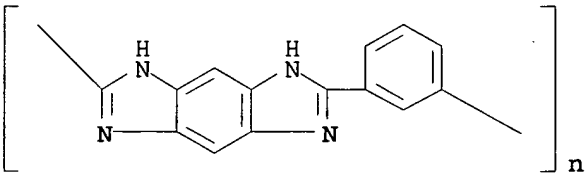
(Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton-conductive polyazole membranes containing sulfonic acid-containing vinyl polymers for fuel cells)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

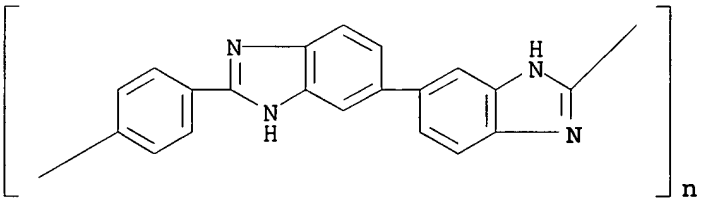
RN 25734-65-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,3-phenylene) (9CI) (CA INDEX NAME)



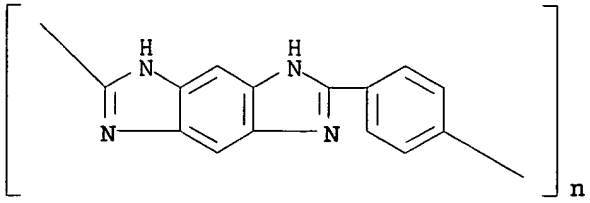
RN 27233-57-4 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1,3-phenylene] (9CI) (CA INDEX NAME)



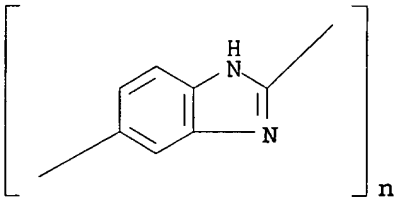
RN 28576-59-2 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,4-phenylene) (9CI) (CA INDEX NAME)



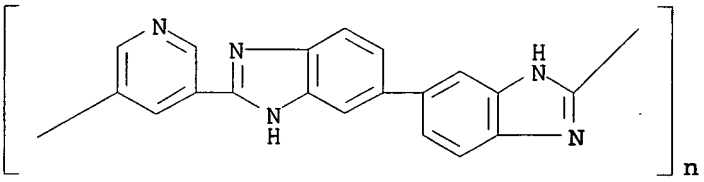
RN 32075-68-6 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1,4-phenylene] (9CI) (CA INDEX NAME)



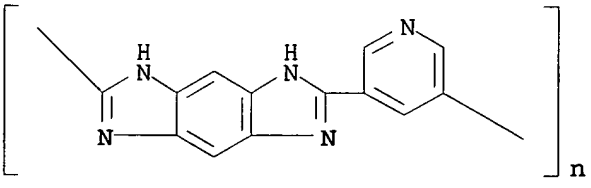
RN 32109-42-5 HCAPLUS
CN Poly(1H-benzimidazole-2,5-diyl) (9CI) (CA INDEX NAME)



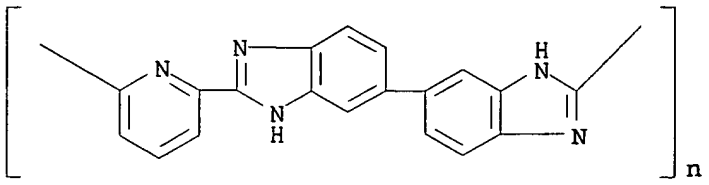
RN 96926-85-1 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-3,5-pyridinediyl) (9CI) (CA INDEX NAME)



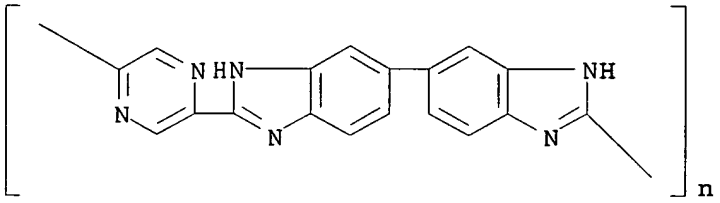
RN 111404-83-2 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-3,5-pyridinediyl] (9CI) (CA INDEX NAME)



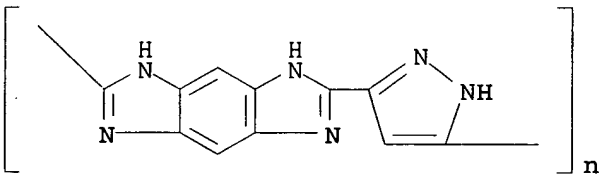
RN 132937-69-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-2,6-pyridinediyl) (9CI) (CA INDEX NAME)



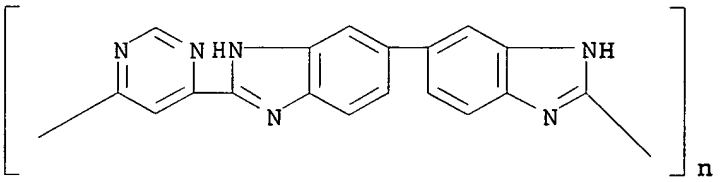
RN 240799-37-5 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-2,5-pyrazinediyl) (9CI) (CA INDEX NAME)



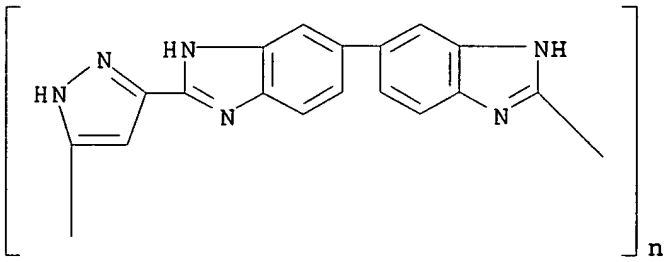
RN 268567-69-7 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-1H-pyrazole-3,5-diyl] (9CI) (CA INDEX NAME)



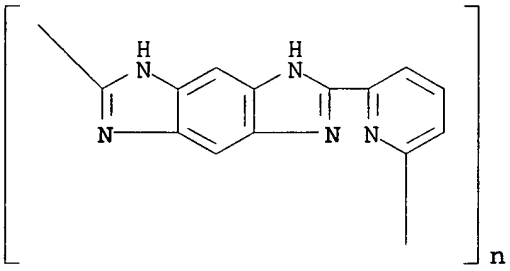
RN 471256-97-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-4,6-pyrimidinediyl) (9CI) (CA INDEX NAME)



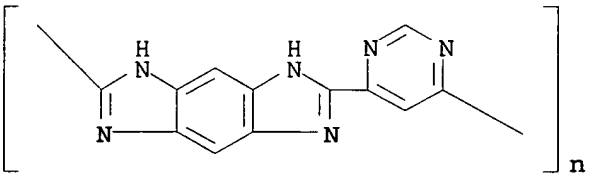
RN 471256-98-1 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1H-pyrazole-3,5-diyl) (9CI) (CA INDEX NAME)



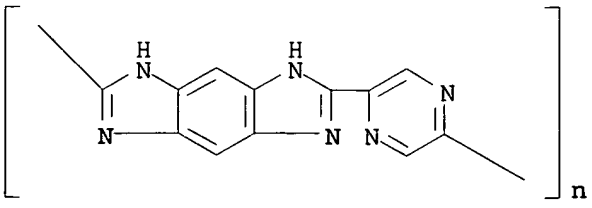
RN 471256-99-2 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-2,6-pyridinediyl] (9CI) (CA INDEX NAME)



RN 471257-00-8 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-4,6-pyrimidinediyl] (9CI) (CA INDEX NAME)



RN 471257-01-9 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)-2,5-pyrazinediyl] (9CI) (CA INDEX NAME)



L48 ANSWER 10 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:36785 HCAPLUS
DN 140:96885

applicants

TI **Proton** conductive **solid** polymer **electrolyte** for electrochemical cell
IN Komiya, Teruaki
PA Honda Giken Kabushiki Kaisha, Japan
SO Eur. Pat. Appl., 14 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | EP 1381107 | A2 | 20040114 | EP 2003-254383 | 20030710 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK | | | | |
| | JP 2004047232 | A2 | 20040212 | JP 2002-201718 | 20020710 |
| | US 2004013925 | A1 | 20040122 | US 2003-616537 | 20030709 |
| PRAI | JP 2002-201718 | A | 20020710 | | |

AB A material such as imidazole (nitrogen-containing heterocyclic compound), which has at least one lone pair, is dispersed in a basic **solid** polymer such as **polybenzimidazole.** The mole number of imidazole per g of **polybenzimidazole** is less than 0.0014 mol, preferably less than 0.0006 mol. The basic **solid** polymer is impregnated with an acidic inorg. liquid such as phosphoric acid and sulfuric acid to prepare a **proton** conductive **solid** polymer **electrolyte.**

IC ICM H01M010-40
ICS H01M006-18; C08G073-18
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, **72**
ST electrochem cell **proton** conductive **solid** polymer **electrolyte**; fuel cell **proton** conductive **solid** polymer **electrolyte**; electrolyzer **proton** conductive **solid** polymer **electrolyte**
IT Azines
RL: DEV (Device component use); USES (Uses)
(diazine; **proton** conductive **solid** polymer **electrolyte** for electrochem. cell)
IT Heterocyclic compounds
RL: DEV (Device component use); USES (Uses)
(nitrogen; **proton** conductive **solid** polymer **electrolyte** for electrochem. cell)
IT Electrochemical cells
**Electrolytic** cells
Fuel cell **electrolytes**
**Solid electrolytes**
(**proton** conductive **solid** polymer **electrolyte** for electrochem. cell)
IT **Polybenzimidazoles**
RL: DEV (Device component use); USES (Uses)
(**proton** conductive **solid** polymer **electrolyte** for electrochem. cell)
IT Ionic conductivity
(**proton**; **proton** conductive **solid** polymer **electrolyte** for electrochem. cell)
IT Fuel cells
(**solid electrolyte**; **proton** conductive **solid** polymer **electrolyte** for electrochem. cell)
IT 7732-18-5, Water, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical

process); PROC (Process)
(electrolysis; **proton** conductive **solid** polymer **electrolyte** for electrochem. cell)

IT 91-22-5, Quinoline, uses 110-86-1, Pyridine, uses 119-65-3, IsoQuinoline 120-72-9, Indole, uses 120-73-0, Purine 288-13-1, Pyrazole 288-32-4, Imidazole, uses **9002-98-6 9003-47-8**, Polyvinylpyridine **25232-42-2**, Polyvinylimidazole **25233-30-1 25823-41-0**, Poly(1-vinylpyrazole) **32109-42-5**, Poly(1H-**benzimidazole**-2,5-diyl) **50641-39-9 131714-35-7**
RL: DEV (Device component use); USES (Uses)
(**proton** conductive **solid** polymer **electrolyte** for electrochem. cell)

IT 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**proton** conductive **solid** polymer **electrolyte** for electrochem. cell)

IT 1333-74-0P, Hydrogen, preparation 7782-44-7P, Oxygen, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(**proton** conductive **solid** polymer **electrolyte** for electrochem. cell)

IT **9002-98-6 9003-47-8**, Polyvinylpyridine **25232-42-2**, Polyvinylimidazole **25233-30-1 25823-41-0**, Poly(1-vinylpyrazole) **32109-42-5**, Poly(1H-**benzimidazole**-2,5-diyl) **50641-39-9 131714-35-7**
RL: DEV (Device component use); USES (Uses)
(**proton** conductive **solid** polymer **electrolyte** for electrochem. cell)

RN 9002-98-6 HCAPLUS
CN Aziridine, homopolymer (9CI) (CA INDEX NAME)

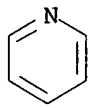
CM 1

CRN 151-56-4
CMF C2 H5 N

RN 9003-47-8 HCAPLUS
CN Pyridine, ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1337-81-1
CMF C7 H7 N
CCI IDS

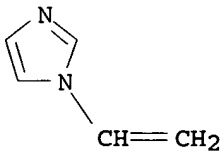


D1— CH═ $CH_2$

RN 25232-42-2 HCAPLUS
CN 1H-Imidazole, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

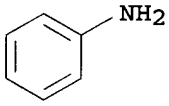
CRN 1072-63-5
CMF C5 H6 N2



RN 25233-30-1 HCAPLUS
CN Benzenamine, homopolymer (9CI) (CA INDEX NAME)

CM 1

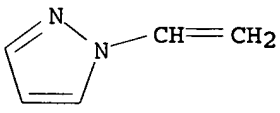
CRN 62-53-3
CMF C6 H7 N



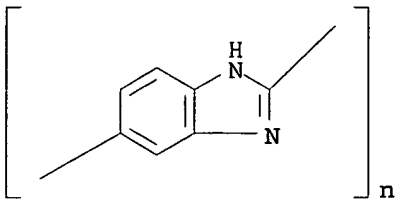
RN 25823-41-0 HCAPLUS
CN 1H-Pyrazole, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 20173-98-2
CMF C5 H6 N2



RN 32109-42-5 HCAPLUS
CN Poly(1H-benzimidazole-2,5-diyl) (9CI) (CA INDEX NAME)



RN 50641-39-9 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diylphenylene) (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 131714-35-7 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)phenylene] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L48 ANSWER 11 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2003:550635 HCAPLUS
DN 139:119902
TI Polymer **electrolyte** fuel cells employing conducting redox polymers as electrode catalysts
IN Abe, Masao; Ishibashi, Kuniaki
PA Nitto Denko Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | JP 2003203641 | A2 | 20030718 | JP 2001-401949 | 20011228 |
| PRAI | JP 2001-401949 | | 20011228 | | |

AB The fuel cell employs a conducting redox polymer as an electrode catalyst, and a **proton**-exchange **electrolyte** membrane made of a hydrocarbon polymer having (hetero atom-containing framework and) acid groups. The fuel cell shows high electromotive force and high discharge d., and can be economically manufactured by employing the hydrocarbyl polymer **electrolytes.**
IC ICM H01M004-90
ICS H01M004-92; H01M008-10
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 67, 76
ST fuel cell electrode redox catalyst conducting polymer; doped conducting polymer redox catalyst fuel cell electrode; sulfonated polymer fuel cell **proton** exchange **electrolyte**; polyaniline conductive polymer fuel cell electrode catalyst; polypyridine conductive polymer fuel cell electrode catalyst; polyindole conductive polymer fuel cell electrode catalyst; Polyphenylquinoxaline conductive polymer fuel cell electrode catalyst
IT Fuel cell electrodes
(conducting polymer redox catalysts in; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Redox reaction catalysts
(conducting polymers; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Phenolic resins, uses
RL: CAT (Catalyst use); DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(novolak, phenolsulfonic acid-based, dopant, in conducting redox polymers; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Doping
(of conducting redox polymer; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Fuel cell **electrolytes**
(polymer; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Polyquinoxalines
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
(polyphenylquinoxalines, redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Polyanilines
RL: CAT (Catalyst use); DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(polyvinylsulfonic acid-doped, redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Conducting polymers
(redox catalysts, in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT Fuel cells
(**solid electrolyte**, polymer **electrolyte**; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT **Polybenzimidazoles**
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(sulfonated, **proton**-exchange **electrolytes**; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT 26101-52-0, Polyvinylsulfonic acid 50973-35-8, Formaldehyde-phenolsulfonic acid copolymer
RL: CAT (Catalyst use); DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(dopant, in polyaniline redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT 7664-93-9, Sulfuric acid, uses

RL: CAT (Catalyst use); DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(dopant, in polyindole redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT 82451-55-6P, Polyindole
RL: CAT (Catalyst use); DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(doped, redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT **25233-30-1P**, Polyaniline
RL: CAT (Catalyst use); DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(polyvinylsulfonic acid-doped, redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT 9003-31-0DP, Polyisoprene, sulfonated 9003-70-7DP, Divinylbenzene-styrene copolymer, sulfonated 76067-46-4P
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(**proton**-exchange **electrolytes**; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

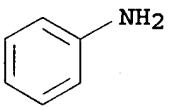
IT 25013-01-8, Polypyridine
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
(redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

IT **25233-30-1P**, Polyaniline
RL: CAT (Catalyst use); DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(polyvinylsulfonic acid-doped, redox catalysts in electrodes; polymer **electrolyte** fuel cells containing conducting redox polymer as electrode catalyst and **proton**-exchange **electrolyte** made of hydrocarbyl polymer having acid groups)

RN 25233-30-1 HCAPLUS
CN Benzenamine, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 62-53-3
CMF C6 H7 N




L48 ANSWER 12 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:640445 HCAPLUS
DN 129:262791

TI Electrochemical cell having polymer blend **electrolyte**
IN Li, Changming; Lian, Ke Keryn; Wu, Han; Chason, Marc
PA Motorola Inc., USA
SO PCT Int. Appl., 16 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| PI WO 9842037 | A1 | 19980924 | WO 1998-US5123 | 19980316 |
| W: CA, CN, JP, KR, MX | | | | |
| RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE | | | | |
| PRAI US 1997-820465 | A | 19970317 | | |

AB An electrochem. cell, a battery or a capacitor, is provided with 1st and 2nd electrodes, and a **solid** polymer **electrolyte** disposed between them. The electrodes may either be of the same or different materials and may be fabricated from Ru, Ir, Co, W, V, Fe, Mo, Hf, Ni, Ag, and/or Zn. The **solid** polymer **electrolyte** is in intimate contact with both the anode and the cathode, and is made from a homogeneous polymer blend of ≥2 polymers which are all ion conducting, and containing doped or dispersed an **electrolyte**-active species.

IC ICM H01M006-18
ICS H01M008-10; H01G009-025
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76
ST electrochem cell polymer blend **electrolyte**; battery polymer blend **electrolyte**; capacitor polymer blend **electrolyte**
IT Epoxy resins, uses
Polyurethanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(acrylates; electrochem. cell having polymer blend **electrolyte**)
IT Polymer blends
RL: DEV (Device component use); USES (Uses)
(electrochem. cell having **electrolyte** of)
IT Phenolic resins, uses
Polyamides, uses
**Polybenzimidazoles**
Polyimides, uses
Polyoxyalkylenes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(electrochem. cell having polymer blend **electrolyte**)
IT Capacitors
Electrochemical cells
(having polymer blend **electrolyte**)
IT Battery **electrolytes**
(polymer blend)
IT Ionomers
RL: TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; electrochem. cell having polymer blend **electrolyte**)
IT 9002-89-5, Poly(vinyl alcohol) **9002-98-6** 9003-01-4, Poly(acrylic acid) 9003-05-8, Polyacrylamide 9003-35-4, Formaldehyde-phenol copolymer 9003-39-8, Poly(vinylpyrrolidone) **9003-47-8**, Poly(vinylpyridine) 24981-14-4, Poly(vinylfluoride) 25249-16-5, Poly(2-hydroxyethyl methacrylate) 25322-68-3, Polyethylene glycol 25585-49-3

RL: TEM (Technical or engineered material use); USES (Uses)
(electrochem. cell having polymer blend **electrolyte**)

IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-33-7, Tungsten, uses 7440-48-4, Cobalt, uses 7440-58-6, Hafnium, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(electrochem.-cell electrodes)

IT **9002-98-6 9003-47-8**, Poly(vinylpyridine)
RL: TEM (Technical or engineered material use); USES (Uses)
(electrochem. cell having polymer blend **electrolyte**)

RN 9002-98-6 HCAPLUS
CN Aziridine, homopolymer (9CI) (CA INDEX NAME)

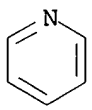
CM 1

CRN 151-56-4
CMF C2 H5 N

RN 9003-47-8 HCAPLUS
CN Pyridine, ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1337-81-1
CMF C7 H7 N
CCI IDS



D1—CH═CH$_2$

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 13 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:421134 HCAPLUS
DN 129:61705
TI Bipolar electrochemical charge storage devices and their fabrication
IN Li, Changming; Jung, Richard H.; Nerz, John
PA Motorola, Inc., USA
SO U.S., 9 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | US 5768090 | A | 19980616 | US 1996-755876 | 19961202 |
| | WO 9825282 | A1 | 19980611 | WO 1997-US21838 | 19971126 |
| | W: JP | | | | |
| | RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE | | | | |
| PRAI | US 1996-755876 | A | 19961202 | | |

AB An electrochem. capacitor cell is provided with 1st and 2nd electrodes, and a solid polymer electrolyte is disposed between them. The electrodes may be either the same or different materials and may be fabricated from Ru, Ir, Co, W, V, Fe, Mo, Hf, Ni, Ag, Zn, and combinations thereof. The solid polymer electrolyte is in intimate contact with both electrodes, and is made from a polymeric support structure having an electrolyte active species dispersed in it. Also a method of fabricating a bipolar electrochem. charge storage device by assembling at least the 1st and 2nd bipolar subassemblies together with the 2nd layer of electrode active material for the 1st bipolar subassembly in direct contact with the 1st layer of electrode active material for the 2nd bipolar subassembly without a current collector disposed between them is described.

IC ICM H01G009-00

INCL 361523000

CC 76-10 (Electric Phenomena)
Section cross-reference(s): 38, **52**, **72**

ST bipolar electrochem charge storage device manuf; polymer electrolyte electrochem capacitor manuf

IT Polyurethanes, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(acrylated; fabrication of bipolar electrochem. charge storage devices containing)

IT Epoxy resins, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(acrylates; fabrication of bipolar electrochem. charge storage devices containing)

IT Capacitors
(electrochem.; fabrication of bipolar electrochem. charge storage devices)

IT Phenolic resins, processes
Polybenzimidazoles
Polyoxyalkylenes, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabrication of bipolar electrochem. charge storage devices containing)

IT Electrolytes
(fabrication of bipolar electrochem. charge storage devices having polymer electrolytes)

IT Polymers, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabrication of bipolar electrochem. charge storage devices having polymer electrolytes)

IT Polyoxyalkylenes, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fluorine- and sulfo-containing, ionomers; fabrication of bipolar electrochem. charge storage devices containing)

IT Polyoxyalkylenes, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(fluorine-containing, sulfo-containing, ionomers; fabrication of bipolar electrochem. charge storage devices containing)

IT Fluoropolymers, processes
Fluoropolymers, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; fabrication of bipolar electrochem. charge storage devices containing)

IT Ionomers
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; fabrication of bipolar electrochem. charge storage devices containing)

IT 1310-58-3, Potassium hydroxide, processes 1310-65-2, Lithium hydroxide (LiOH) 1310-73-2, Sodium hydroxide (NaOH), processes 7439-88-5, Iridium, processes 7439-89-6, Iron, processes 7439-98-7, Molybdenum, processes 7440-02-0, Nickel, processes 7440-18-8, Ruthenium, processes 7440-22-4, Silver, processes 7440-33-7, Tungsten, processes 7440-48-4, Cobalt, processes 7440-58-6, Hafnium, processes 7440-62-2, Vanadium, processes 7440-66-6, Zinc, processes 7647-01-0, Hydrogen chloride, processes 7664-38-2, Phosphoric acid, processes 7664-93-9, Sulfuric acid, processes 7697-37-2, Nitric acid, processes 9002-89-5, Polyvinyl alcohol **9002-98-6** 9003-01-4, Polyacrylic acid 9003-05-8, Polyacrylamide 9003-06-9, Acrylamide-acrylic acid copolymer 9003-35-4, Phenol-formaldehyde copolymer 9003-39-8, Poly(vinyl pyrrolidone) **9003-47-8**, Poly(vinyl pyridine) 12036-10-1, Ruthenium oxide (RuO2) 24981-14-4, Poly(vinyl fluoride) 25249-16-5, Poly(2-hydroxyethyl methacrylate) 25322-68-3, Polyethylene glycol 28390-30-9 **29011-20-9** 85885-77-4, Cerium hydroxide (CeOH)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabrication of bipolar electrochem. charge storage devices containing)

IT **9002-98-6 9003-47-8**, Poly(vinyl pyridine)
**29011-20-9**
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabrication of bipolar electrochem. charge storage devices containing)

RN 9002-98-6 HCAPLUS
CN Aziridine, homopolymer (9CI) (CA INDEX NAME)

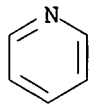
CM 1

CRN 151-56-4
CMF C2 H5 N

RN 9003-47-8 HCAPLUS
CN Pyridine, ethenyl-, homopolymer (9CI) (CA INDEX NAME)

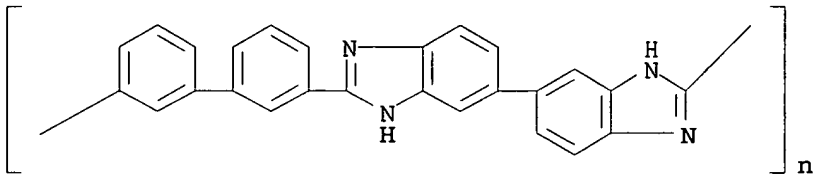
CM 1

CRN 1337-81-1
CMF C7 H7 N
CCI IDS



D1— CH═ $CH_2$

RN 29011-20-9 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl[1,1'-biphenyl]-3,3'-diyl) (9CI) (CA INDEX NAME)



Formula I

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 14 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:221042 HCAPLUS
DN 128:244948
TI Preparation of acid-doped polymer films as electrolytes in fuel cells
IN Sansone, Michael J.; Onorato, Frank J.; French, Stuart M.; Marikar, Faruq
PA Hoechst Celanese Corp., USA; Sansone, Michael J.; Onorato, Frank J.; French, Stuart M.; Marikar, Faruq
SO PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | WO 9814505 | A1 | 19980409 | WO 1997-US17790 | 19970929 |
| | W: AU, BR, CA, CN, JP, KP, KR, MX, US | | | | |
| | RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE | | | | |
| | CA 2266101 | AA | 19980409 | CA 1997-2266101 | 19970929 |
| | AU 9748939 | A1 | 19980424 | AU 1997-48939 | 19970929 |
| | BR 9712247 | A | 19990824 | BR 1997-12247 | 19970929 |
| | EP 954544 | A1 | 19991110 | EP 1997-911615 | 19970929 |
| | EP 954544 | B1 | 20020327 | | |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, IT, LI, LU, NL, SE, PT, IE, FI | | | | |
| | JP 2001517254 | T2 | 20011002 | JP 1998-516869 | 19970929 |
| | AT 215107 | E | 20020415 | AT 1997-911615 | 19970929 |
| | ES 2175369 | T3 | 20021116 | ES 1997-911615 | 19970929 |
| | TW 402616 | B | 20000821 | TW 1997-86114314 | 19971001 |
| | KR 2000048799 | A | 20000725 | KR 1999-702790 | 19990331 |
| PRAI | US 1996-27169P | P | 19961001 | | |
| | WO 1997-US17790 | W | 19970929 | | |

AB The acid-doped polymer membranes such as polybenzimidazole are prepared by coagulating a polymeric dope solution in a liquid coagulation bath (containing solvent and/or nonsolvent); submerging the resulting membrane into a

nonsolvent bath to remove any residual solvent; placing the membrane into an acid solution, wherein the pores are filled with the acid solution; and drying the membrane to remove residual nonsolvent which collapses the porous structure entrapping the acid and forming a dense film. An alternative method involves coagulating a polymer solution directly into an acid/solvent/nonsolvent mixture to produce a porous membrane which imbibes the acid solution and dried. Thus, a dope solution containing 10 g poly[2,2'-(m-phenylene)-5,5'-bibenzimidazole] and 90 g dimethylacetamide was coagulated in water to form a membrane, which was soaked in a 85% of phosphoric acid aq solution at 23° for 2 min, and dried to give a dense film containing 52% acid.

IC ICM C08J005-22
ICS H01M008-10

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): **52**, 76

ST acid doped polybenzimidazole electrolyte fuel cell; polyphenylene benzimidazole doped film fuel cell; phosphoric acid doped polyphenylene benzimidazole film

IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyoxadiazoles
Polyquinoxalines
Polythiazoles
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(acid-doped; preparation of acid-doped polymer films as electrolytes in fuel cells)

IT Electrolytic cells
(membrane; preparation of acid-doped polymer films for)

IT Fuel cell electrolytes
Fuel cells
(preparation of acid-doped polymer films as electrolytes in fuel cells)

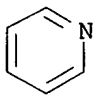
IT **110-86-1D**, Pyridine, derivs., polymers, uses **288-32-4D**, Imidazole, derivs., polymers 289-95-2D, Pyrimidine, derivs., polymers 9042-50-6 **25734-65-0** 26101-19-9, 3,3'-Diaminobenzidine-isophthalic acid copolymer
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(acid-doped; preparation of acid-doped polymer films as electrolytes in fuel cells)

IT 7664-38-2, Phosphoric acid, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polybenzimidazole doped with; preparation of acid-doped polymer films as electrolytes in fuel cells)

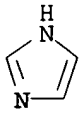
IT 75-75-2, Methanesulfonic acid 7664-93-9, Sulfuric acid, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(polymers doped with; preparation of acid-doped polymer films as electrolytes in fuel cells)

IT **110-86-1D**, Pyridine, derivs., polymers, uses **288-32-4D**, Imidazole, derivs., polymers **25734-65-0**
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(acid-doped; preparation of acid-doped polymer films as electrolytes in fuel cells)

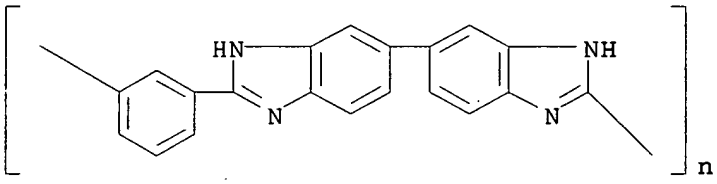
RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 25734-65-0 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diyl-1,3-phenylene) (9CI) (CA INDEX NAME)



RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 15 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1992:618623 HCAPLUS
DN 117:218623
TI Manufacture of graphite films with flexibility and toughness
IN Ebara, Jun; Nishiki, Naomi; Nakamura, Katsuyuki; Murakami, Mutsuaki
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | JP 04149012 | A2 | 19920522 | JP 1990-273994 | 19901011 |
| | JP 3041933 | B2 | 20000515 | | |
| PRAI | JP 1990-273994 | | 19901011 | | |

AB The graphite films, useful for electrodes, heating elements, and gaskets, are manufactured by alternately laminating polymer films and graphite films (as separators) for preventing contact between the polymer films, and heat treating at ≥2400°. Optionally, the laminate is wound on graphite-type C cylinder, and heat treated at 2400°. The polymer films (thickness ≤400 μm) are polyoxadiazole, polybenzothiazole, polybenzobisthiazole, polybenzoxazole, polybenzobisoxazole, aromatic polyimides, aromatic polyamide, polyphenylenebisimidazole, polyphenylenebenzobisimidazole, polythiazole, polythiazole and/or poly-para-phenylenevinylene. Thus, graphite films having tensile strength 518 kg/cm2 were manufactured from poly-para-phenylene-1,3,4-oxadiazole films

(thickness 200 μm) by the process.
IC ICM C01B031-04
ICS C04B035-54
CC 57-8 (Ceramics)
Section cross-reference(s): 49, **72**, 76
ST graphite film flexibility toughness; electrode gasket graphite film; heating element graphite film
IT Polybenzoxazoles
RL: USES (Uses)
(graphite films from, with flexibility and toughness, for heating element)
IT Electrodes
Gaskets
(graphite, with flexibility and toughness, manufacture of)
IT Polyamides, uses
Polyimides, uses
RL: USES (Uses)
(aromatic, graphite films from, with flexibility and toughness, for heating element)
IT Polymers, uses
RL: USES (Uses)
(polybenzothiazoles, graphite films from, with flexibility and toughness, for heating element)
IT Polymers, uses
RL: USES (Uses)
(polyoxadiazoles, graphite films from, with flexibility and toughness, for heating element)
IT Polymers, uses
RL: USES (Uses)
(polythiazoles, graphite films from, with flexibility and toughness, for heating element)
IT 7782-42-5P, Graphite, preparation
RL: PREP (Preparation)
(films, with flexibility and toughness, manufacture of, for electrodes and heating elements and gaskets)
IT 95-16-9D, Benzothiazole, derivs., polymers 273-53-0, Benzoxazole 288-47-1D, Thiazole, derivs., polymers 288-99-3D, 1,3,4-Oxadiazole, derivs., polymer 25036-53-7 26009-24-5, Poly(1,4-phenylene-1,2-ethenediyl) 26023-46-1 **50641-39-9**, Poly(phenylenebenzimidazole) 90940-20-8 **131714-35-7** 143204-28-8
RL: USES (Uses)
(graphite films from, with flexibility and toughness, for heating element)
IT **50641-39-9**, Poly(phenylenebenzimidazole) **131714-35-7**
RL: USES (Uses)
(graphite films from, with flexibility and toughness, for heating element)
RN 50641-39-9 HCAPLUS
CN Poly([5,5'-bi-1H-benzimidazole]-2,2'-diylphenylene) (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 131714-35-7 HCAPLUS
CN Poly[(1,5-dihydrobenzo[1,2-d:4,5-d']diimidazole-2,6-diyl)phenylene] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

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L2          20 SEA FILE=REGISTRY ABB=ON  (110-86-1/BI OR 119-65-3/BI OR
               120-72-9/BI OR 120-73-0/BI OR 131714-35-7/BI OR 1333-74-0/BI
               OR 25232-42-2/BI OR 25233-30-1/BI OR 25823-41-0/BI OR 288-13-1/
               BI OR 288-32-4/BI OR 32109-42-5/BI OR 50641-39-9/BI OR
               7664-38-2/BI OR 7664-93-9/BI OR 7732-18-5/BI OR 7782-44-7/BI
               OR 9002-98-6/BI OR 9003-47-8/BI OR 91-22-5/BI)
L4           8 SEA FILE=REGISTRY ABB=ON  L2 AND PMS/CI
L5           2 SEA FILE=REGISTRY ABB=ON  L4 AND BENZIMID?
L6           6 SEA FILE=REGISTRY ABB=ON  L4 NOT L5
L9         270 SEA FILE=REGISTRY ABB=ON  1409.114.5/RID
L10        103 SEA FILE=REGISTRY ABB=ON  L9 AND PMS/CI
L11         12 SEA FILE=REGISTRY ABB=ON  L2 NOT L4
L12          7 SEA FILE=REGISTRY ABB=ON  L11 AND 1-2/NR
L20         79 SEA FILE=HCAPLUS ABB=ON  L5
L21      22338 SEA FILE=HCAPLUS ABB=ON  L6
L22          4 SEA FILE=HCAPLUS ABB=ON  L20 AND L21
L23     110325 SEA FILE=REGISTRY ABB=ON  333.401.37/RID
L24       1405 SEA FILE=REGISTRY ABB=ON  L23 AND PMS/CI
L25       1391 SEA FILE=HCAPLUS ABB=ON  L24
L26         19 SEA FILE=HCAPLUS ABB=ON  L21 AND L25
L27         20 SEA FILE=HCAPLUS ABB=ON  L22 OR L26
L30        125 SEA FILE=HCAPLUS ABB=ON  L10
L31          0 SEA FILE=HCAPLUS ABB=ON  L21 AND L30
L32      16178 SEA FILE=HCAPLUS ABB=ON  L12/D
L33          4 SEA FILE=HCAPLUS ABB=ON  L30 AND L32
L34         18 SEA FILE=HCAPLUS ABB=ON  L25 AND L32
L36         36 SEA FILE=HCAPLUS ABB=ON  L27 OR L31 OR L33 OR L34
L37         11 SEA FILE=HCAPLUS ABB=ON  L36 AND ELECTROCHEM?/SC,SX
L40        385 SEA FILE=HCAPLUS ABB=ON  ?BENZIMIDAZ? AND L32
L41        111 SEA FILE=HCAPLUS ABB=ON  ?BENZIMIDAZ? AND L21
L42        486 SEA FILE=HCAPLUS ABB=ON  L40 OR L41
L43         34 SEA FILE=HCAPLUS ABB=ON  L42 AND ELECTROCHEMICAL?/SC
L44         24 SEA FILE=HCAPLUS ABB=ON  L43 AND ELECTROLYT?
L45         14 SEA FILE=HCAPLUS ABB=ON  L43 AND PROTON?
L46         25 SEA FILE=HCAPLUS ABB=ON  L44 OR L45
L47          7 SEA FILE=HCAPLUS ABB=ON  L46 AND SOLID?
L48         15 SEA FILE=HCAPLUS ABB=ON  L37 OR L47
L49      91966 SEA FILE=HCAPLUS ABB=ON  L12
L50          7 SEA FILE=HCAPLUS ABB=ON  L49 AND L20
L51         35 SEA FILE=HCAPLUS ABB=ON  L49 AND L25
L52         35 SEA FILE=HCAPLUS ABB=ON  L50 OR L51
L53       2438 SEA FILE=HCAPLUS ABB=ON  L49 AND ?BENZIMIDAZ?
L54         55 SEA FILE=HCAPLUS ABB=ON  L53 AND ELECTROLYT?
L55         85 SEA FILE=HCAPLUS ABB=ON  L52 OR L54
L56         16 SEA FILE=HCAPLUS ABB=ON  L55 AND ELECTROCHEMICAL?/SC
L57         27 SEA FILE=HCAPLUS ABB=ON  L48 OR L56
L58         12 SEA FILE=HCAPLUS ABB=ON  L57 NOT L48
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=> d l58 bib abs ind hitstr 1-12

L58  ANSWER 1 OF 12  HCAPLUS  COPYRIGHT 2006 ACS on STN
AN   2006:367267  HCAPLUS
DN   144:373163
TI   Substituted nitrogen heterocycles as proton carriers for water-free proton
     exchange membranes for fuel cells
IN   Goddard, William A.; Deng, Wei-Qiao; Molinero, Valeria
PA   California Institute of Technology, USA
SO   U.S. Pat. Appl. Publ., 16 pp.
     CODEN: USXXCO
```

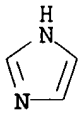
DT Patent
LA English
FAN.CNT 1

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| PI US 2006083976 | A1 | 20060420 | US 2005-148766 | 20050608 |
| PRAI US 2004-578034P | P | 20040609 | | |

AB A fuel cell is provided comprising an anode, a cathode, a catalyst, and a polymer **electrolyte** membrane comprising a heterocyclic compound with a nitrogen heteroatom and at least one electron-withdrawing substituent. The fuel cell operates at temps. above about 100°., preferably above about 150°. The heterocyclic compound is preferably a substituted imidazole or benzoimidazole, most preferably a fluorinated imidazole. The heterocyclic compound is preferably liquid at the fuel cell operating temperature The catalyst preferably contains platinum. The polymer **electrolyte** membrane preferably has a conductivity of 10-2 S/cm2 or higher. For efficient fuel cell operation the catalyst should not be poisoned to an undue degree by the heterocyclic compound, and so the binding energy of the heterocyclic compound to the catalyst should be low.

INCL 429033000; 521027000
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 27
ST fuel cell proton exchange membrane substituted nitrogen heterocycle
IT Catalysts
(electrocatalysts; substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine- and sulfo-containing, ionomers; substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT Heterocyclic compounds
RL: DEV (Device component use); USES (Uses)
(nitrogen; substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT Fuel cells
(proton exchange membrane; substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT Fuel cell **electrolytes**
(substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); USES (Uses)
(substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT 51-17-2D, **Benzimidazole**, substituted **288-32-4D**, Imidazole, substituted
RL: DEV (Device component use); USES (Uses)
(substituted nitrogen heterocycles as proton carriers for water-free

proton exchange membranes for fuel cells)
IT 630-08-0, Carbon monoxide, miscellaneous
RL: MSC (Miscellaneous)
(substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT 7440-44-0, Carbon, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
IT **288-32-4D**, Imidazole, substituted
RL: DEV (Device component use); USES (Uses)
(substituted nitrogen heterocycles as proton carriers for water-free proton exchange membranes for fuel cells)
RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



L58 ANSWER 2 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2006:97621 HCAPLUS
DN 144:174271
TI Fuel cell systems/stacks showing stable open-circuit voltage and cell resistance, their membrane-electrode assemblies (MEA), and manufacture thereof
IN Nakafuji, Kunihiro; Muneuchi, Atsuo
PA Sanyo Electric Co., Ltd., Japan; Samsung Electronics Co., Ltd.; Samsung SDI Co, Ltd.
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | JP 2006032275 | A2 | 20060202 | JP 2004-213072 | 20040721 |
| | CN 1725538 | A | 20060125 | CN 2005-10084796 | 20050721 |
| PRAI | JP 2004-213072 | A | 20040721 | | |

AB Mixing carbon powders and binders by wet process, rolling the mixts. and drying to form carbon sheets, and arranging them between **electrolytic** membranes and anodes and/or cathodes to give the MEA. The **electrolytic** layers consist of basic polymers (e.g., powders with volume-average diameter 10-100 μm) and strong acids. Fuel cell systems employing the MEA show stable open-circuit voltage and cell resistance under non humidification condition.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell MEA carbon interlayer **electrolyte** retaining; gas barrier carbon interlayer fuel cell MEA; strong acid basic polymer **electrolyte** fuel cell
IT **Polybenzimidazoles**
Polybenzothiazoles
Polybenzoxazoles
Polyoxadiazoles

Polyquinolines
Polyquinoxalines
Polythiazoles
RL: DEV (Device component use); USES (Uses)
(acid-doped, **electrolyte** layers; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(binders; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

IT Fuel cells
(polymer **electrolyte**; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

IT **110-86-1D**, Pyridine, polymers 129-00-0D, Pyrene, tetraza, polymers **288-32-4D**, Imidazole, polymers 288-42-6D, Oxazole, polymers 289-06-5D, Thiadiazole, polymers 289-95-2, Pyrimidine 1337-81-1D, Vinylpyridine, polymers 29383-23-1D, Vinylimidazole, polymers
RL: DEV (Device component use); USES (Uses)
(acid-doped, **electrolyte** layers; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

IT 9002-84-0, Polytetrafluoroethylene
RL: DEV (Device component use); USES (Uses)
(binders, **electrolytic** layers; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

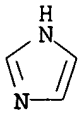
IT 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(dopants, **electrolyte** layers; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(powders; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

IT **110-86-1D**, Pyridine, polymers **288-32-4D**, Imidazole, polymers
RL: DEV (Device component use); USES (Uses)
(acid-doped, **electrolyte** layers; PEFC employing carbon interlayer-formed MEA and having stable open-circuit voltage and cell resistance)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)


RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



L58 ANSWER 3 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2006:20401 HCAPLUS
DN 144:91179
TI Solid polymer **electrolyte**, electrode for fuel cell, and the fuel cell
IN Aihara, Yuichi
PA Samsung Yokohama Research Institute, Japan
SO PCT Int. Appl., 19 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | WO 2006001083 | A1 | 20060105 | WO 2004-JP9494 | 20040629 |

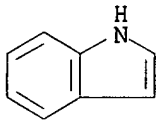
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRAI WO 2004-JP9494 20040629

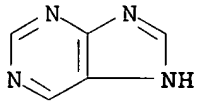
AB The solid polymer **electrolyte** comprises an acid and a polymer of an iminoimidazolidinedione compound The electrode contains an electrode substance and the above solid polymer **electrolyte.** The fuel cell has an **electrolyte** membrane between a pair of electrodes; where a part or whole part of the **electrolyte** membrane contains the above solid polymer **electrolyte.**

IC ICM H01M008-02
ICS H01M008-10; H01B001-06; H01M004-86
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST fuel cell electrode solid polymer **electrolyte** iminoimidazolidinedione compd
IT Fuel cell electrodes
Fuel cell **electrolytes**
Fuel cells
(polymer **electrolytes** containing iminoimidazolidinedione compound polymers for fuel cells)
IT 81139-34-6 154204-01-0 872523-82-5
RL: DEV (Device component use); USES (Uses)
(polymer **electrolytes** containing iminoimidazolidinedione compound polymers for fuel cells)
IT 51-17-2, **Benzimidazole 120-72-9**, Indole, uses **120-73-0**, Purine **288-32-4**, Imidazol, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polymer **electrolytes** containing iminoimidazolidinedione compound

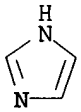
polymers for fuel cells)
IT **120-72-9**, Indole, uses **120-73-0**, Purine **288-32-4**
, Imidazol, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polymer **electrolytes** containing iminoimidazolidinedione compound
polymers for fuel cells)
RN 120-72-9 HCAPLUS
CN 1H-Indole (9CI) (CA INDEX NAME)



RN 120-73-0 HCAPLUS
CN 1H-Purine (9CI) (CA INDEX NAME)



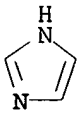
RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L58 ANSWER 4 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:1206832 HCAPLUS
DN 143:424619
TI Water-free proton conductors for fuel cells on the basis of imidazole and **benzimidazole**
AU Hinz, Susanne
CS Germany
SO (2005) No pp., given, http://www.meind.de/search.py?261376 Avail.:
Metadata on Internet Documents, Order No. 261376
From: Metadata Internet Doc. [Ger. Diss.] 2005, (D1031-2), No pp. given
DT Dissertation
LA German
AB Unavailable
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76
ST fuel cell **electrolyte** proton conductor **benzimidazole** imidazole
IT Ionic conductors
(protonic; water-free proton conductors for fuel cells based on

imidazole and **benzimidazole**)
IT Fuel cell **electrolytes**
Fuel cells
(water-free proton conductors for fuel cells based on imidazole and **benzimidazole**)
IT 51-17-2, **Benzimidazole 288-32-4**, Imidazole, uses
RL: DEV (Device component use); USES (Uses)
(water-free proton conductors for fuel cells based on imidazole and **benzimidazole**)
IT **288-32-4**, Imidazole, uses
RL: DEV (Device component use); USES (Uses)
(water-free proton conductors for fuel cells based on imidazole and **benzimidazole**)
RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



L58 ANSWER 5 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:822804 HCAPLUS
DN 143:196912
TI Proton-conducting **electrolyte** material for fuel cell
IN Saito, Toshiya; Hase, Kohei
PA Toyota Motor Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

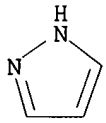
| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | JP 2005222890 | A2 | 20050818 | JP 2004-32103 | 20040209 |
| | CA 2527705 | AA | 20050818 | CA 2005-2527705 | 20050118 |
| | WO 2005076398 | A1 | 20050818 | WO 2005-JP817 | 20050118 |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

| | | | |
|---|---|---|---|
| PRAI | JP 2004-32103 | A | 20040209 |
| | WO 2005-JP817 | W | 20050118 |

AB The claimed **electrolyte** material consists of (a) Bronsted acid and (b) base having an unshared electron pair, where the base has ≥1 of group satisfying nos. of constituent atoms other than H ≤3. The base may be selected from derivs. of imidazole, pyrazole, triazole, pyridine, pyrazine, pyrimidine, and pyridazine. The material provides high proton conductivity under humidification-free condition.
IC ICM H01M008-02

ICS H01M008-10
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST proton conducting **electrolyte** Bronsted acid imidazole deriv fuel cell
IT Fuel cell **electrolytes**
(proton-conducting **electrolyte** material containing Bronsted acid and unshared electron pair-containing base for fuel cell)
IT Bronsted acids
RL: TEM (Technical or engineered material use); USES (Uses)
(proton-conducting **electrolyte** material containing Bronsted acid and unshared electron pair-containing base for fuel cell)
IT Ionic conductors
(protonic; proton-conducting **electrolyte** material containing Bronsted acid and unshared electron pair-containing base for fuel cell)
IT 51-17-2, **Benzimidazole** 75-75-2, Methanesulfonic acid 103-74-2, 2-(2-Hydroxyethyl)pyridine 104-15-4, p-Toluenesulfonic acid, uses **288-13-1D**, Pyrazole, derivs. 288-88-0D, 1H-1,2,4-Triazole, derivs. 289-80-5D, Pyridazine, derivs. 289-95-2D, Pyrimidine, derivs. 290-37-9D, Pyrazine, derivs. 616-47-7, 1-Methylimidazole 693-98-1, 2-Methylimidazole
RL: TEM (Technical or engineered material use); USES (Uses)
(proton-conducting **electrolyte** material containing Bronsted acid and unshared electron pair-containing base for fuel cell)
IT **288-13-1D**, Pyrazole, derivs.
RL: TEM (Technical or engineered material use); USES (Uses)
(proton-conducting **electrolyte** material containing Bronsted acid and unshared electron pair-containing base for fuel cell)
RN 288-13-1 HCAPLUS
CN 1H-Pyrazole (9CI) (CA INDEX NAME)

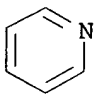


L58 ANSWER 6 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:696488 HCAPLUS
DN 143:196828
TI Gel **electrolyte** and electrode for fuel cell
IN Aihara, Yuichi
PA Japan
SO U.S. Pat. Appl. Publ., 7 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 2

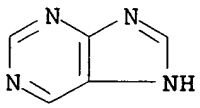
| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | US 2005170252 | A1 | 20050804 | US 2005-37231 | ~~20050~~119 |
| | JP 2005209379 | A2 | 20050804 | JP 2004-11869 | 20040120 |
| PRAI | JP 2004-11869 | A | 20040120 | | |
| | KR 2004-73362 | A | 20040914 | | |

AB A gel **electrolyte** can have high proton conductivity even at conditions of no humidity and high temps. and can have increased mech. strength. The gel **electrolyte** can include an acid and a matrix polymer capable of being swollen by the acid. The matrix polymer can be a polyparabanic

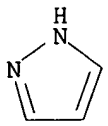
acid or a derivative thereof.
IC ICM H01M008-10
ICS H01M010-40; H01M004-86
INCL 429303000; 429314000; 429042000; 429033000
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell electrode gel **electrolyte** polymer
IT Fuel cell electrodes
Fuel cell **electrolytes**
(gel **electrolyte** and electrode for fuel cell)
IT Polyparabanic acids
RL: DEV (Device component use); USES (Uses)
(gel **electrolyte** and electrode for fuel cell)
IT 51-17-2, **BenzImidazole** 101-60-0D, Porphyrin, derivs. 109-97-7D, Pyrrole, derivs. **110-86-1D**, Pyridine, derivs. **120-73-0**, Purine **288-13-1**, Pyrazole **288-32-4**, Imidazole, uses 289-95-2D, Pyrimidine, derivs. 290-37-9D, Pyrazine, derivs. 574-93-6D, Phthalocyanine, derivs.
RL: DEV (Device component use); USES (Uses)
(gel **electrolyte** and electrode for fuel cell)
IT 28550-63-2P 28555-74-0P 31626-60-5P 35297-16-6P 37725-18-1P 54351-47-2P 113587-56-7P 113587-62-5P 861927-58-4P 861927-59-5P 861927-60-8P 861927-61-9P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(gel **electrolyte** and electrode for fuel cell)
IT 7664-38-2, Phosphoric acid, uses
RL: MOA (Modifier or additive use); USES (Uses)
(gel **electrolyte** and electrode for fuel cell)
IT **110-86-1D**, Pyridine, derivs. **120-73-0**, Purine **288-13-1**, Pyrazole **288-32-4**, Imidazole, uses
RL: DEV (Device component use); USES (Uses)
(gel **electrolyte** and electrode for fuel cell)
RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



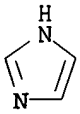

RN 120-73-0 HCAPLUS
CN 1H-Purine (9CI) (CA INDEX NAME)




RN 288-13-1 HCAPLUS
CN 1H-Pyrazole (9CI) (CA INDEX NAME)



RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



L58 ANSWER 7 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:695899 HCAPLUS
DN 143:196811
TI Gel **electrolytes** showing high proton conductivity and mechanical strength, fuel cell electrodes containing them, and fuel cells
IN Aihara, Yuichi
PA Samsung SDI Co., Ltd., S. Korea
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 2

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | JP 2005209379 | A2 | 20050804 | JP 2004-11869 | 20040120 |
| | US 2005170252 | A1 | 20050804 | US 2005-37231 | 20050119 |
| PRAI | JP 2004-11869 | A | 20040120 | | |
| | KR 2004-73362 | A | 20040914 | | |

AB The gel **electrolytes** contain acids and acid-swelling matrix polymers comprising polyparabanic acids. The fuel cells using the electrodes and **electrolyte** membranes containing the gel **electrolytes** show high proton conductivity at high temperature under nonhumidified condition.

IC ICM H01M008-02
ICS C08K003-32; C08K005-34; C08L079-04; H01B001-06; H01M008-10
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST acid doped polyparabanic acid **electrolyte** fuel cell; fuel cell electrode acid doped polyparabanic acid; proton conductor acid doped polyparabanic acid
IT Conducting polymers
Fuel cell electrodes
Fuel cell **electrolytes**
(gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)
IT Porphyrins
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)
IT Polyparabanic acids

RL: DEV (Device component use); IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(phosphoric acid-doped; gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

IT Polyparabanic acids
RL: DEV (Device component use); IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, phosphoric acid-doped; gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

IT Fuel cells
(polymer **electrolyte**; gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

IT Polyethers, uses
RL: DEV (Device component use); IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyparabanic acid-, phosphoric acid-doped; gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

IT Ionic conductors
(protonic; gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

IT 7664-38-2, Phosphoric acid, uses
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(dopant; gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

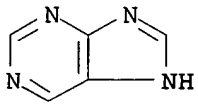
IT 51-17-2, **Benzimidazole** 109-97-7, Pyrrole **110-86-1**, Pyridine, uses **120-73-0**, Purine **288-13-1**, Pyrazole **288-32-4**, Imidazole, uses 289-95-2, Pyrimidine 290-37-9, Pyrazine 574-93-6, Phthalocyanine
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

IT 28550-63-2P, Diphenylmethane diisocyanate-hydrocyanic acid copolymer 28555-74-0P 31626-60-5P 35297-16-6P 37725-18-1P, Diphenylmethane diisocyanate-hydrocyanic acid copolymer, sru 54351-47-2P, Hydrocyanic acid-2,4-TDI copolymer, sru 113587-56-7P 113587-62-5P 861927-58-4P 861927-59-5P 861927-60-8P 861927-61-9P
RL: DEV (Device component use); IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(phosphoric acid-doped; gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

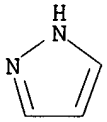
IT **110-86-1**, Pyridine, uses **120-73-0**, Purine **288-13-1**, Pyrazole **288-32-4**, Imidazole, uses
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(gel **electrolytes** showing high proton conductivity and mech. strength for fuel cell electrodes and **electrolyte** membranes)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

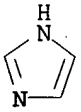
RN 120-73-0 HCAPLUS
CN 1H-Purine (9CI) (CA INDEX NAME)



RN 288-13-1 HCAPLUS
CN 1H-Pyrazole (9CI) (CA INDEX NAME)



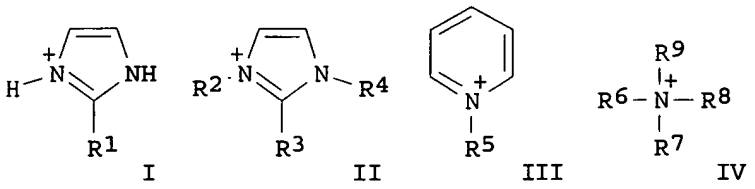
RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



L58 ANSWER 8 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:546330 HCAPLUS
DN 143:81095
TI Imidazolium solid polymer **electrolytes** and fuel cells
IN Fujibayashi, Nobuki
PA Samsung SDI Co., Ltd., S. Korea
SO Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | JP 2005166598 | A2 | 20050623 | JP 2003-407443 | 20031205 |
| PRAI | JP 2003-407443 | | 20031205 | | |

OS MARPAT 143:81095
GI



I II III IV

AB The title **electrolytes** providing high ionic conductivity in 100-300° in relative humidity below 50% comprise a polymer, amine derivative cations, and anions. The amine derivative cations include 2-imidazolium derives. (I: R1 = C1+ alkyl), pyridinium derivs., 1,2,3-imidazolium (II: R2-4 = H, C1+ alkyl, but not simultaneously H), pyridinium derivs. (III: R5 = C1+ alkyl), and/or quaternary ammonium derivs. (IV: R6-9 = C1+ alkyl). The anions may include AlCl4-, Al3Cl8-, Al2Cl7-, PF6-, BF4-, CF3SO3-, (CF3SO2)2N-, and/or (CF3SO2)3C-. The polymer may include polytetrafluoroethylene, polyether ether ketone, **polybenzimidazole**, polybenzoxazole, and/or polybenzothiazole. The **electrolyte** composition gives sufficient proton conductivity and makes the fuel cells operable in sufficient output power in 100-300° in relative humidity below 50%.

IC ICM H01M008-02
ICS H01B001-06; H01M008-10

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 28

ST imidazolium solid polymer **electrolyte** fuel cell proton cond humidity; pyridinium solid polymer **electrolyte** fuel cell proton cond humidity; quaternary ammonium solid polymer **electrolyte** fuel cell proton cond

IT Pyridinium compounds
Quaternary ammonium compounds, uses
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**electrolyte** composition for fuel cells; imidazolium solid polymer **electrolytes** and fuel cells)

IT Fuel cell **electrolytes**
(imidazolium and solid polymer; imidazolium solid polymer **electrolytes** and fuel cells)

IT Onium compounds
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(imidazolium compds., **electrolyte** composition for fuel cells; imidazolium solid polymer **electrolytes** and fuel cells)

IT Fuel cells
Ionic conductivity
(imidazolium solid polymer **electrolytes** and fuel cells)

IT Fluoropolymers, uses
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(imidazolium solid polymer **electrolytes** and fuel cells)

IT Polyketones
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(polyether-, solid polymer **electrolyte** composition, for fuel cells; imidazolium solid polymer **electrolytes** and fuel cells)

IT Polyethers, uses
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(polyketone-, solid polymer **electrolyte** composition, for fuel cells; imidazolium solid polymer **electrolytes** and fuel cells)

IT Humidity

(relative; imidazolium solid polymer **electrolytes** and fuel cells)

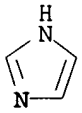
IT **Polybenzimidazoles**
Polybenzothiazoles
Polybenzoxazoles
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(solid polymer **electrolyte** composition, for fuel cells; imidazolium solid polymer **electrolytes** and fuel cells)

IT Polymer **electrolytes**
(solid polymer with imidazolium cations; imidazolium solid polymer **electrolytes** and fuel cells)

IT **288-32-4**, Imidazole, uses 693-98-1, 2-Methylimidazole
9002-84-0D, Polytetrafluoroethylene, reformed with sulfonic acid derivs.
82113-65-3 145022-44-2, 1-Ethyl-3-methylimidazolium trifluoromethanesulfonate 551952-12-6
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(solid polymer **electrolyte** composition, for fuel cells; imidazolium solid polymer **electrolytes** and fuel cells)

IT **288-32-4**, Imidazole, uses
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(solid polymer **electrolyte** composition, for fuel cells; imidazolium solid polymer **electrolytes** and fuel cells)

RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



L58 ANSWER 9 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2003:875559 HCAPLUS
DN 139:367552
TI Multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating
IN Uensal, Oemer; Kiefer, Joachim
PA Celanese Ventures GmbH, Germany; Pemeas GmbH
SO PCT Int. Appl., 49 pp.
CODEN: PIXXD2
DT Patent
LA German
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | WO 2003092090 | A2 | 20031106 | WO 2003-EP4117 | 20030422 |
| | WO 2003092090 | A3 | 20050120 | | |
| | W: BR, CA, CN, JP, KR, MX, US | | | | |
| | RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR | | | | |
| | DE 10218368 | A1 | 20031106 | DE 2002-10218368 | 20020425 |
| | DE 10218367 | A1 | 20031113 | DE 2002-10218367 | 20020425 |
| | CA 2483015 | AA | 20031106 | CA 2003-2483015 | 20030422 |
| | EP 1518282 | A2 | 20050330 | EP 2003-718780 | 20030422 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, SK | | | | |
| | CN 1650463 | A | 20050803 | CN 2003-809351 | 20030422 |

| | | | | | |
|---|---|---|---|---|---|
| | US 2005181254 | A1 | 20050818 | US 2003-512264 | 20030422 |
| | JP 2005527948 | T2 | 20050915 | JP 2004-500346 | 20030422 |
| PRAI | DE 2002-10218367 | A | 20020425 | | |
| | DE 2002-10218368 | A | 20020425 | | |
| | WO 2003-EP4117 | W | 20030422 | | |

AB Proton-conducting multi-layered **electrolyte** membranes for fuel cells are characterized by at least one mineral acid-doped or mineral acid-containing flat surfaces and a barrier layer for the other layer, which, together, make up a membrane electrode assembly. Preferred mineral acids include H3PO4, H2SO4, and polyphosphoric acids. The barrier layer, which preferably consists of a cation exchanger with cation-exchange capacity <0.9 meq/g and a proton conductivity <0.06 S/cm, has a thickness of 10-30 μm (preferably <10 μm). The flat surfaces of the membrane consist of a basic polymer (or a basic polymer integrated with a second polymer or an inert support), selected from polyimidazoles, **polybenzimidazoles**, polybenzthiazoles, polybenzoxazoles, polytriazoles, polyoxadiazoles, polythiadiazoles, polypyrazoles, polyquinoxalines, polypyridines, polypyrimidines, or poly(tetraazapyrenes). Such multilayer **electrolyte** membranes prevents mineral acid from being washed out and reduces the overvoltage on the cathode.

IC ICM H01M

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST multilayered **electrolyte** electrode membrane fuel cell; basic polymer **electrolyte** electrode membrane fuel cell; **polybenzimidazole electrolyte** electrode membrane fuel cell

IT Polyphosphoric acids
RL: TEM (Technical or engineered material use); USES (Uses)
(membrane assembly containing; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT **Polybenzimidazoles**
Polybenzothiazoles
Polybenzoxazoles
Polyoxadiazoles
Polyquinoxalines
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT Fuel cell electrodes
Fuel cell **electrolytes**
Fuel cell separators
(multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT Polysulfones, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyether-, membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT Polyketones
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyether-, sulfonated, membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers,

and a cation exchange-type barrier coating)

IT Polyethers, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyketone-, sulfonated, membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT Polyethers, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polysulfone-, membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(membrane assembly containing; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

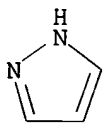
IT 620168-47-0, Ultrason E 7020P
RL: DEV (Device component use); USES (Uses)
(membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT **110-86-1D**, Pyridine, derivs., polymers **288-13-1D**, Pyrazole, derivs., polymers 288-88-0D, 1H-1,2,4-Triazole, derivs., polymers 289-06-5D, Thiadiazole, derivs., polymers 289-95-2D, Pyrimidine, derivs., polymers 7258-75-5D, Pyrimido[4,5,6-gh]perimidine, 1,6-dihydro-, derivs., polymers 27380-27-4D, Pek, sulfonated
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

IT **110-86-1D**, Pyridine, derivs., polymers **288-13-1D**, Pyrazole, derivs., polymers
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(membranes; multilayered **electrolyte**-electrode membrane assemblies containing mineral acids, basic polymers, and a cation exchange-type barrier coating)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

RN 288-13-1 HCAPLUS
CN 1H-Pyrazole (9CI) (CA INDEX NAME)



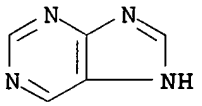
L58 ANSWER 10 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2003:454898 HCAPLUS
DN 139:39126
TI Nonaqueous **electrolytes** for lithium primary and secondary batteries
IN Barbarich, Thomas J.
PA Yardney Technical Products, Inc., USA
SO U.S. Pat. Appl. Publ., 15 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | US 2003108800 | A1 | 20030612 | US 2002-289784 | 20021107 |
| | US 6852446 | B2 | 20050208 | | |
| PRAI | US 2001-347083P | P | 20011109 | | |

OS MARPAT 139:39126
AB A nonaq. elec. current producing electrochem. cell is provided comprising an anode and a cathode, an ionically permeable separator interposed between the anode and the cathode, and a nonaq. **electrolyte**, the **electrolyte** comprising an ionically conducting salt in a nonaq. medium, the ionically conducting salt corresponding to the formula: M+(Z*(J*)j(X*)x)-, wherein: M is a lithium atom, Z* is an anion group containing two or more Lewis basic sites and comprising less than 50 atoms not including hydrogen atoms, J* independently each occurrence is a Lewis acid coordinated to at least one Lewis basic site of Z*, and optionally two or more such J* groups may be joined together in a moiety having multiple Lewis acidic functionality, X* independently each occurrence is selected from the group consisting of H, C1-4 alkyl, alkoxide, halide and mixts. thereof, j is an integer from 2 to 12, and x is an integer from 0 to 4.
IC ICM H01M010-40
ICS H01M004-58; H01M004-60
INCL 429324000; 429231950; 429231400; 429213000; 429303000; 429307000; 429338000; 429342000; 429332000; 429333000
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST lithium battery nonaq **electrolyte**
IT Polymers, uses
RL: DEV (Device component use); USES (Uses)
(gels; nonaq. **electrolytes** for lithium primary and secondary batteries)
IT Chalcogenides
Oxides (inorganic), uses
RL: DEV (Device component use); USES (Uses)
(lithiated; nonaq. **electrolytes** for lithium primary and secondary batteries)
IT Primary batteries
Secondary batteries
(lithium; nonaq. **electrolytes** for lithium primary and secondary batteries)
IT Glass, uses
RL: DEV (Device component use); USES (Uses)
(membrane; nonaq. **electrolytes** for lithium primary and secondary batteries)
IT Battery **electrolytes**
Ionic conductivity
Polar solvents
(nonaq. **electrolytes** for lithium primary and secondary

batteries)
IT Esters, uses
Ethers, uses
Lactones
Nitriles, uses
Polyanilines
Sulfones
Transition metal chalcogenides
Transition metal oxides
RL: DEV (Device component use); USES (Uses)
(nonaq. **electrolytes** for lithium primary and secondary batteries)
IT Disulfides
RL: DEV (Device component use); USES (Uses)
(organic, redox polymers; nonaq. **electrolytes** for lithium primary and secondary batteries)
IT Transition metal compounds
RL: DEV (Device component use); USES (Uses)
(oxysulfides; nonaq. **electrolytes** for lithium primary and secondary batteries)
IT Lithium alloy, base
RL: DEV (Device component use); USES (Uses)
(nonaq. **electrolytes** for lithium primary and secondary batteries)
IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(mesocarbon microbeads; nonaq. **electrolytes** for lithium primary and secondary batteries)
IT 57-12-5, Cyanide, uses 60-29-7, Diethyl ether, uses 96-48-0, γ-Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane **120-73-0D**, Purine, derivs. 504-66-5D, Dicyanamide, derivs. 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 646-06-0, Dioxolane 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compound 14343-69-2, Azide 17655-31-1, Amide 17997-24-9D, Methanetricarbonitrile, ion(1-), derivs. 25233-30-1, Polyaniline 25948-29-2, Carbon disulfide homopolymer 28737-40-8D, Squarate ion(2-), derivs. 32178-55-5D, **Benzimidazolide**, derivs. 34512-21-5D, derivs. 36954-03-7D, Imidazole anion, derivs. 39448-96-9, Graphite lithium 51719-91-6D, derivs. 64544-32-7D, derivs. 68146-66-7D, derivs. 81425-01-6D, derivs. 217309-42-7, Copper lithium nickel oxide Cu0.2LiNi0.8O2 261356-47-2D, Borate(1-), tetrakis(cyano-κC)-, derivs. 519040-72-3 527685-88-7 527685-89-8 527685-90-1 527685-91-2 527685-92-3 527685-93-4 527685-94-5 527685-95-6 527685-96-7 527685-98-9 527686-01-7 527686-04-0 527686-06-2 527686-08-4 541502-73-2D, derivs. 541502-74-3D, derivs.
RL: DEV (Device component use); USES (Uses)
(nonaq. **electrolytes** for lithium primary and secondary batteries)
IT 55986-39-5P, Lithium imidazolide 148505-26-4P 464194-97-6P 519040-73-4P 519040-74-5P 519040-75-6P 527685-86-5P 527685-87-6P 527686-13-1P 527686-16-4P
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(nonaq. **electrolytes** for lithium primary and secondary batteries)
IT 9002-88-4, Polyethylene
RL: DEV (Device component use); USES (Uses)
(separator; nonaq. **electrolytes** for lithium primary and

secondary batteries)
IT **120-73-0D**, Purine, derivs.
RL: DEV (Device component use); USES (Uses)
(nonaq. **electrolytes** for lithium primary and secondary batteries)
RN 120-73-0 HCAPLUS
CN 1H-Purine (9CI) (CA INDEX NAME)



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L58 ANSWER 11 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:575465 HCAPLUS
DN 137:143037
TI Method for preparing thin fiber-structured polymer web
IN Lee, Wha Seop; Jo, Seong Mu; Chun, Suk Won; Choi, Sung Won
PA S. Korea
SO U.S. Pat. Appl. Publ., 8 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | US 2002100725 | A1 | 20020801 | US 2001-14550 | 20011214 |
| | KR 2002063020 | A | 20020801 | KR 2001-3685 | 20010126 |
| | JP 2002249966 | A2 | 20020906 | JP 2001-382608 | 20011217 |
| | CN 1367276 | A | 20020904 | CN 2002-102522 | 20020125 |
| PRAI | KR 2001-3685 | A | 20010126 | | |

AB Disclosed is a method for preparing a thin fiber-structured polymer web suitable for a high-speed and large-scale production using electrospinning. The method uses an electrospinning process to spin a solution containing a polymer in a volatile solvent to obtain a thin fiber-structured polymer web on a collector, in which case the temperature of the polymer solution is in the range of from 40° to the b.p. of the solvent. The porous, thin fiber-structured polymer web thus obtained is applicable to the isolation layer or the **electrolytic** layer for lithium-ion secondary battery, lithium-metal secondary battery or sulfur-based secondary battery, the isolation layer for fuel cells, filter, and so forth.
IC ICM B01D039-08
INCL 210503000
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 37, 47
ST battery **electrolyte** layer fiber structured polymer web; sulfur based secondary battery fiber structured polymer web; lithium secondary battery fiber structured polymer web; fuel cell fiber structured polymer web; filter fiber structured polymer web
IT Polyamide fibers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(aramid; method for preparing thin fiber-structured polymer web)

IT Polyesters, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(aromatic; method for preparing thin fiber-structured polymer web)
IT Secondary batteries
(lithium; method for preparing thin fiber-structured polymer web)
IT Battery **electrolytes**
Coal tar pitch
Filters
Fuel cells
Petroleum pitch
Secondary batteries
Sensors
(method for preparing thin fiber-structured polymer web)
IT Carbonaceous materials (technological products)
Coke
RL: DEV (Device component use); USES (Uses)
(method for preparing thin fiber-structured polymer web)
IT Biopolymers
Collagens, uses
Fluoropolymers, uses
Polyanilines
**Polybenzimidazoles**
Polyesters, uses
Polyoxyalkylenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(method for preparing thin fiber-structured polymer web)
IT Polyoxymethylenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(polyoxyalkylene-; method for preparing thin fiber-structured polymer web)
IT Polyoxyalkylenes, uses
Polyoxyalkylenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(polyoxymethylene-; method for preparing thin fiber-structured polymer web)
IT Fibers
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(spinning, electro-; method for preparing thin fiber-structured polymer web)
IT Polymers, uses
Synthetic polymeric fibers, uses
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(webs; method for preparing thin fiber-structured polymer web)
IT Lithium alloy, base
RL: DEV (Device component use); USES (Uses)
(method for preparing thin fiber-structured polymer web)
IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(hard; method for preparing thin fiber-structured polymer web)
IT 1314-62-1, Vanadia, uses 1332-29-2, Tin oxide 7439-93-2, Lithium, uses 7439-93-2D, Lithium, compound 7782-42-5, Graphite, uses 12017-96-8, Chromium lithium oxide crlio2 12022-46-7, Iron lithium oxide felio2 12031-65-1, Lithium nickel oxide linio2 12037-42-2, Vanadium oxide v6o13 12057-17-9, Lithium manganese oxide limn2o4 12057-19-1, Lithium titanium oxide litio2 12162-87-7, Lithium vanadium oxide livo2 12169-03-8,

Lithium yttrium oxide liyo2 12190-79-3, Cobalt lithium oxide colio2 12209-15-3, Lithium scandium oxide lisco2 13568-36-0, Lithium nickel vanadium oxide linivo4 162004-08-2, Cobalt lithium nickel oxide colinio2 210767-01-4, Lithium manganese oxide limn2o2
RL: DEV (Device component use); USES (Uses)
(method for preparing thin fiber-structured polymer web)

IT 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9002-89-5, Polyvinyl alcohol 9002-98-6, PolyAziridine 9003-20-7, Polyvinyl acetate 9003-55-8, Butadiene-styrene copolymer 9004-34-6, Cellulose, uses 9004-35-7, Cellulose acetate 9004-36-8 9011-08-9 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-16-4, Nylon 12 24937-79-9, Pvdf 24980-34-5, Ethylene sulfide polymer 24980-41-4, Caprolactone homopolymer 25014-41-9, Polyacrylonitrile 25038-59-9, Polyethylene terephthalate, uses 25085-53-4, Isotactic polypropylene 25086-89-9, Vinyl acetate-vinyl pyrrolidone copolymer 25233-30-1, Polyaniline 25322-69-4, Polypropylene oxide 25569-53-3, Poly(ethylene succinate) 25749-57-9 26063-00-3, Polyhydroxybutyrate) 26100-51-6, Polylactic acid 26124-68-5, Polyglycolic acid 27083-66-5, Poly(propylene fumarate) 34346-01-5, Glycolic acid-DL-lactic acid copolymer 50327-22-5 98973-15-0, Poly(bis-(2-(2-methoxy-ethoxyethoxy))phosphazene 136511-06-3, Meep
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(method for preparing thin fiber-structured polymer web)

IT 56-23-5, Carbon tetrachloride, uses 60-29-7, Diethyl ether, uses 64-17-5, Ethanol, uses 64-19-7, Acetic acid, uses 67-56-1, Methanol, uses 67-63-0, Isopropanol, uses 67-64-1, Acetone, uses 67-66-3, Chloroform, uses 67-68-5, Dmso, uses 68-12-2, Dmf, uses 71-43-2, Benzene, uses 75-05-8, Acetonitrile, uses 75-09-2, Methylene chloride, uses 80-73-9, 1,3-Dimethyl-2-imidazolidinone 96-47-9, 2-Methyltetrahydrofuran 96-48-0, Butyrolactone 96-49-1, Ethylene carbonate 100-51-6, Benzyl alcohol, uses 105-58-8, Diethyl carbonate 107-31-3, Methyl formate 108-32-7, Propylene carbonate 108-88-3, Toluene, uses 108-94-1, Cyclohexanone, uses 108-95-2, Phenol, uses 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 110-82-7, Cyclohexane, uses **110-86-1**, Pyridine, uses 123-91-1, 1,4-Dioxane, uses 126-33-0, Sulfolane 127-19-5, n,n-Dimethylacetamide 554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 646-06-0, 1,3-Dioxolane 872-50-4, 1-Methyl-2-pyrrolidone, uses 4437-85-8, Butylene carbonate 7529-22-8, n-Methylmorpholine-n-oxide 7732-18-5, Water, uses 19836-78-3, 3-Methyloxazolidin-2-one 25323-89-1, Trichloroethane 62309-51-7, Propanol
RL: TEM (Technical or engineered material use); USES (Uses)
(method for preparing thin fiber-structured polymer web)

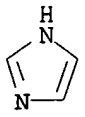
IT 25322-68-3
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(polyoxymethylene-; method for preparing thin fiber-structured polymer web)

IT **110-86-1**, Pyridine, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(method for preparing thin fiber-structured polymer web)

RN 110-86-1 HCAPLUS
CN Pyridine (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

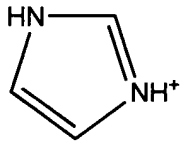
L58 ANSWER 12 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:171004 HCAPLUS
DN 137:127444
TI Imidazole and 1-methyl imidazole in phosphoric acid doped **polybenzimidazole**, **electrolyte** for fuel cells
AU Schechter, Alex; Savinell, Robert F.
CS E.B. Yeager Center for Electrochemical Sciences, Case Western Reserve University, Cleveland, OH, 44106-7217, USA
SO Solid State Ionics (2002), 147(1,2), 181-187
CODEN: SSIOD3; ISSN: 0167-2738
PB Elsevier Science B.V.
DT Journal
LA English
AB Imidazole and 1-Me imidazole (Me-Im) were used as additives in **polybenzimidazole** (PBI) equilibrated with phosphoric acid (PA), a system shown to be a high-temperature proton-conducting polymer **electrolyte.** The influence of different concns. of this additive on the conductivity of these membranes was measured by a four-probe conductivity measurement, at temps. in the range of 80-200 °C, under various humidity conditions. Correlation was found between the conductivity of liquid solns. of concentrated phosphoric acid and that of H3PO4 in the PBI membranes.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST imidazole phosphoric acid doped **polybenzimidazole** membrane **electrolyte** fuel cell; Me imidazole phosphoric acid doped **polybenzimidazole electrolyte** fuel cell
IT Fuel cell **electrolytes**
Fuel cell separators
(imidazole and 1-Me imidazole in phosphoric acid doped **polybenzimidazole** membrane as **electrolyte** for fuel cells)
IT Ionic conductivity
(membranes; imidazole and 1-Me imidazole in phosphoric acid doped **polybenzimidazole** membrane as **electrolyte** for fuel cells)
IT **Polybenzimidazoles**
RL: DEV (Device component use); USES (Uses)
(polymer **electrolyte**; imidazole and 1-Me imidazole in phosphoric acid doped **polybenzimidazole** membrane as **electrolyte** for fuel cells)
IT **288-32-4**, Imidazole, uses 616-47-7, 1-Methyl imidazole 7664-38-2, Phosphoric acid, uses
RL: MOA (Modifier or additive use); USES (Uses)
(imidazole and 1-Me imidazole in phosphoric acid doped **polybenzimidazole** membrane as **electrolyte** for fuel cells)
IT **288-32-4**, Imidazole, uses
RL: MOA (Modifier or additive use); USES (Uses)
(imidazole and 1-Me imidazole in phosphoric acid doped **polybenzimidazole** membrane as **electrolyte** for fuel cells)

RN 288-32-4 HCAPLUS
CN 1H-Imidazole (9CI) (CA INDEX NAME)



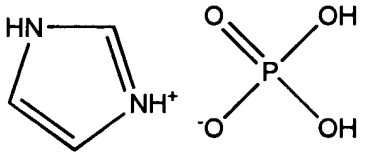
RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

=>

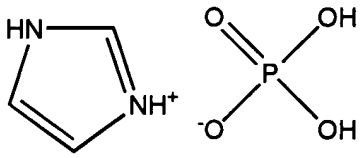



imidazolium

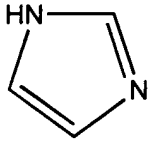
Caution: A net charge appears to be present



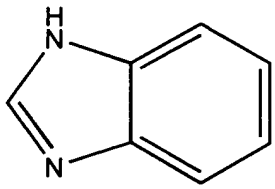

imidazolium dihydrogen phosphate



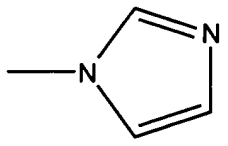

imidazolium dihydrogenphosphate salt




imidazole




benzimidazole




1-methyl imidazole